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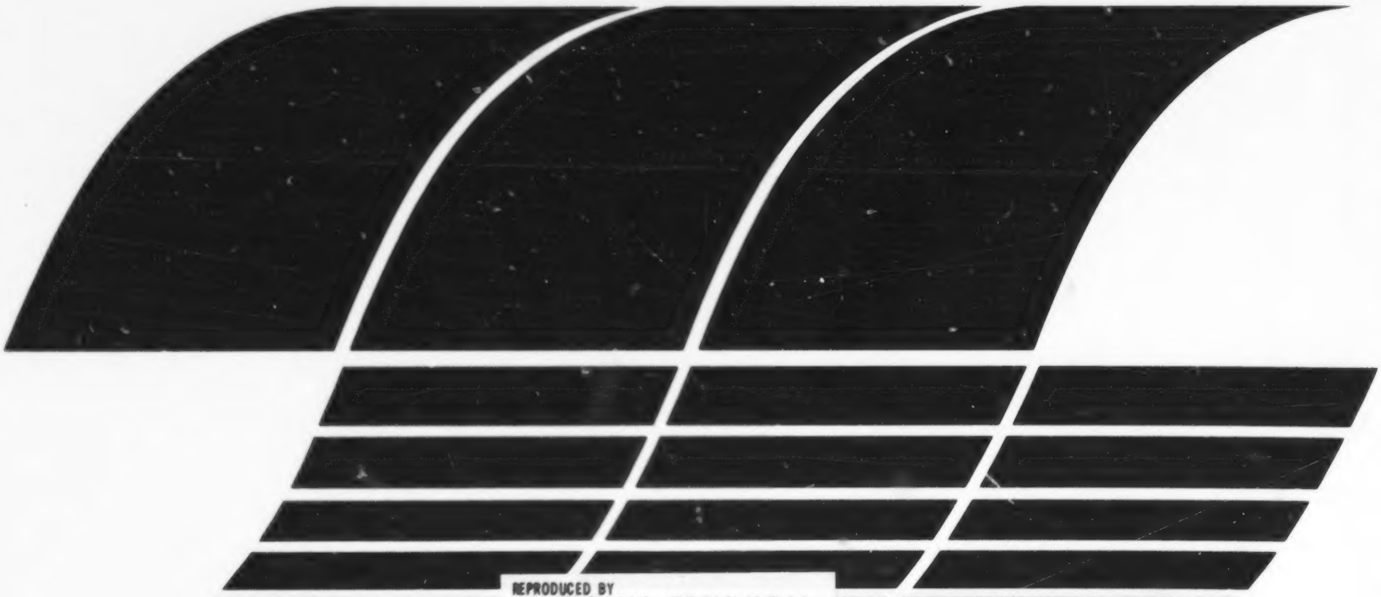
Research and Development

Inventory of Current Indoor Air Quality-Related Research

Interagency Research Group on Indoor Air Quality

Interagency Energy/Environment R&D Program Report



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16. ABSTRACT

The Inventory lists a total of 171 current or recently completed projects relating to indoor air quality. It covers six specific areas of research: monitoring, instrumentation, health effects, control technology, risk assessment and pollutant characterization. It is cross-referenced to the following pollutant groups: radon, nitrogen oxides, carbon monoxide, formaldehyde, asbestos, respirable particulates, organics, tobacco smoke, odor, ozone, biological pollutants and multi-pollutant studies. Information provided for each project includes the name of the principal investigator, project sponsor, funding level and abstract.

The Inventory is designed to be a useful tool for researchers in the field of indoor air pollution and for analysts, architects, builders and administrators who need to understand the problem, as well as possible solutions. Among other things, the document identifies experts who can advise the building industry on any indoor air quality topic under study.

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A PLAN FOR A NATIONAL PROGRAM
OF
INDOOR AIR QUALITY RESEARCH

INVENTORY OF CURRENT
INDOOR AIR RELATED RESEARCH

Compiled by

Dr. C. Beat Meyer

Edited by

Robert P. Hartley

U.S. Environmental Protection Agency
Office of Research and Development
Office of Environmental Engineering and Technology
Industrial Environmental Research Laboratory
Cincinnati, Ohio 45268

April, 1981

FOREWORD

The document lists an inventory of research projects currently underway or recently completed which relate to indoor air quality. It is organized according to the areas of monitoring, instrumentation, health effects, and control technology and cross-referenced to enable users to identify classes of pollutants to which each research project applies.

The inventory has been prepared under the auspices of the Interagency Research Group on Indoor Air Quality, as a part of its development of "A Plan for a National Program on Indoor Air Research." The Research Group is comprised of representatives from several federal agencies including:

Department of Energy
Environmental Protection Agency
National Institute for Occupational Safety and Health
Consumer Products Safety Commission
National Institute for Environmental Health Sciences
Department of Housing and Urban Development
Department of Commerce

Other federal agencies which may have responsibilities or interests in indoor air quality have been and are invited to participate in the Research Group.

We are confident that the Plan being prepared will define a coordinated, cost-efficient research program to identify and correct the significant indoor air quality problems. Perhaps just as importantly, it can allow building energy conservation initiatives to progress without the constraint of associated buildups of indoor air pollutants.

It is our hope that researchers will find this a useful tool, enabling greater contact among peers and promoting efficiency of overall effort. We invite updating information (for example, the inventory does not address a large body of work on infiltration and ventilation) and will revise the document when enough new or corrected entries have been received. Send such information to:

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David R Berg
David R. Berg
Environmental Protection Agency

Howard D. R
Howard Ross
Department of Energy

Co-Chairmen, Interagency Research
Group on Indoor Air Quality

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INTRODUCTION

This inventory of current research projects related to indoor air quality is one of two appendices to "A Plan for a National Program of Indoor Air Quality Research." The inventory forms the basis for an organized interagency research agenda.

The inventory contained herein is the result of an intensive solicitation effort by Dr. C. Beat Meyer, Professor of Chemistry, University of Washington, while on assignment to the Environmental Protection Agency's Industrial Environmental Research Laboratory - Cincinnati. The solicitation began with a telephone inquiry to persons known to be performing research related to indoor air quality. This inquiry had a multiplying effect in that the persons contacted provided information on research being done by still others. Subsequent to the telephone inquiry, Dr. Meyer solicited written project descriptions, and these are the direct basis for the descriptions published herein.

After the project descriptions were received, they were edited to some extent to facilitate uniformity of presentation, by Robert P. Hartley, EPA Industrial Environmental Research Laboratory - Cincinnati. Every attempt has been made to preserve the technical content and the information should still be regarded as the responsibility of the person solicited. In a few cases, the abstract has been shortened, where necessary, to fit the material on one page. Also the material has been entirely retyped into a standard format, with the attendant possibility of typographical errors. The persons providing the information should check their project descriptions for accuracy and make errors known to Mr. Hartley for correction in succeeding issues or, if necessary, by publication of errata sheets.

The inventory is incomplete. There are certain to be many research projects related to indoor air quality that are not included, particularly projects supported by State agencies and projects that are carried out without government support. Also there are probably many federal government supported projects that have been overlooked: some, for example, have come to our attention too late to be included herein. The inventory thus remains open and project information will continue to be solicited for periodic updates of this document.

Inventory Format

The inventory of research projects is comprised of three inter-related parts. The first part of the inventory is a list of abbreviations found throughout the inventory. Most of the abbreviations are those for government agency names. Note that some of the agencies are subdivisions of larger governmental organizations that in turn are noted in parentheses at the end of the abbreviation identification.

The second part is an Index/Summary of the Indoor Air Research Inventory. In this part all of the inventoried projects are summarized; each project is numbered (the Inventory Number) and the sponsoring organization, principal investigator, and study objectives are listed. Also noted in matrix form are the research areas and pollutants being addressed. The projects of each sponsoring agency are grouped together, so that the activities of each agency can be surveyed quickly.

The third part is the Indoor Air Research Inventory itself, or the project description sheets. The Inventory Number, in the upper right hand corner, is the index number shown on the Index/Summary described above. The project description sheets contain all of the requested information that the supplier was willing to provide; blank spaces indicate that the information has not been provided, it being unknown, confidential, or none to report. Further information, or updated information should be available from the Project Officer or the Principal Investigator, one or both of whose telephone numbers and addresses are provided.

Acknowledgments

We gratefully acknowledge the assistance of all those persons who provided information for the research inventory. They are inherently identified, within the inventory. As noted earlier the inventory is the result of the diligence of Dr. C. Beat Meyer, assisted in report editing and formatting by Robert P. Hartley of the Energy Pollution Control Division of the EPA Industrial Environmental Research Laboratory-Cincinnati. The inventory forms part of "A Plan for a National Program of Indoor Air Quality Research," prepared under the auspices of the Interagency Research Group on Indoor Air Quality. The Research group is co-chaired by David R. Berg of EPA's Office of Research and Development and Howard Ross of DOE's Office of Conservation and Solar Energy. Mr. Berg has assisted directly in the preparation and review of the inventory.

LIST OF ABBREVIATIONS

AGAL - American Gas Association Laboratories
AECB - Atomic Energy Control Board (Canada)
AFB - Air Force Base
ANL - Argonne National Laboratory
ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASTM - American Society for Testing and Materials

BM, BOM, BuM - Bureau of Mines

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CPSC - Consumer Proudcts Safety Commission
CS - Office of Conservation and Solar Energy (DOE)

DBBS - Division of Biomedical and Behavioral Sciences (NIOSH)
DFEOH - Division of Federal Employees Occupational Health (PHS)
DHES - Department of Health and Environmental Sciences (Montana)
DHHS - Department of Health and Human Services
DOE - Department of Energy
DOI - Department of the Interior
DPSE - Division of Physical Sciences and Engineering (NIOSH)

EERF - Eastern Environmental Radiation Facility (ORP)
EPA - Environmental Protection Agency
EPRI - Electric Power Research Institute
EV - Office of Environment (DOE)

FAA - Federal Aviation Administration

GC - gas chromatograph
GRI - Gas Research Institute

HCOH - formaldehyde
HERL - Health Effects Research Laboratory (ORD)
HHS - Department of Health and Human Services
HUD - Department of Housing and Urban Development
HVAC - heating, ventilating, and air conditioning

IAQ - indoor air quality
IERL - Industrial Environmental Research Laboratory (OEET)
IITRI - Illinois Institute of Technology Research Institute
IRLG - Interagency Regulatory Liaison Group

JPL - Jet Propulsion Laboratory

K - potassium

LBL - Lawrence Berkeley Laboratory
LV - Las Vegas
LVF - Las Vegas Facility (ORP)

MIT - Massachusetts Institute of Technology
MSHA - Mine Safety and Health Administration

NAS - National Academy of Sciences
NBS - National Bureau of Standards
NH_3 - ammonia
NIBS - National Institute of Building Sciences
NIEHS - National Institute for Environmental Health Sciences (HHS)
NIOSH - National Institute for Occupational Safety and Health (HHS)
NO_x - nitrogen oxides
NRC - Nuclear Regulatory Commission
NRC - National Research Council

OEET - Office of Environmental Engineering and Technology (ORD)
OEHL - Occupational and Environmental Health Laboratory (USAF)
OEPER - Office of Environmental Process Effects Research (ORD)
OHER - Office of Health Effects Research (EV)
OHR - Office of Health Research (ORD)
OMTS - Office of Monitoring and Technical Support (ORD)
ONAC - Office of Noise Abatement and Control (EPA)
OPM - Office of Program Management (CPSC)
ORD - Office of Research and Development (EPA)
ORNL - Oak Ridge National Laboratory
ORP - Office of Radiation Programs (EPA)
OSHA - Occupational Safety and Health Administration
OWRT - Office of Water Resources and Technology (DOI)

PCP - pentachlorophenol
PHS - Public Health Service
PNA - polynuclear aromatic hydrocarbon

Rn - radon
RPISU - Radon Progeny Integrated Sampling Unit
RSP - respirable suspended particulates
RTI - Research Triangle Institute
RTP - Research Triangle Park

SERI - Solar Energy Research Institute
SO_2 - sulfur dioxide

TSP - total suspended particulates

UCLA - University of California at Los Angeles
UF - urea formaldehyde
USAF - United States Air Force
USBM - United States Bureau of Mines
USDA - United States Department of Agriculture
USN - United States Navy
UV - ultraviolet

WHO - World Health Organization

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INDOOR AIR RESEARCH INVENTORY

INV. NO.	SPONSOR	INVESTIGATOR & ORGANIZATION	SUBJECT	STUDY AREA						POLLUTANT											
				MONITORING	INSTRUMENTATION	HEALTH EFFECTS	RISK ASSESSMENT	CONTROL TECHNOLOGY	CHARACTERIZATION	RADON	NO_x	CO	HCOH	ASBESTOS	RSP	ORGANICS	TOBACCO SMOKE	ODOR	OZONE	BIOLOGICAL	MULTI-POLLUTANT
1	DOE/CS	Craig Hollowell, LBL James Berk, LBL	Indoor air characterization in various buildings and energy situations.						x												x
2	DOE/CS	Craig Hollowell, LBL Greg Traynor, LBL	Indoor air quality modeling						x												x
3	DOE/CS	Craig Hollowell, LBL Wm. Cain, Wm. Duffy, TRC	Odor studies					x									x	x			
4	DOE/CS	Craig Hollowell, LBL Mark Chatigny, Naval Biosciences Laboratory	Microbial burden with energy-efficient ventilation practices.					x												x	
5	DOE/CS	Craig Hollowell, LBL Robert Banks, U. of Minn.	Hospital standards and energy conservation strategies.					x													x
6	DOE/CS	Craig Hollowell, LBL Robert Miksch, LBL	Organic characterization	x	x								x			x					
7	DOE/CS	Craig Hollowell, LBL Anthony Nero, LBL	Radon characterization and monitoring techniques development.	x	x			x	x	x											
8	DOE/CS	Craig Hollowell, LBL Greg Traynor, LBL	Develop passive and powered field instrumentation.	x	x							x	x		x						
9	DOE/CS	Craig Hollowell, LBL Gary Roseme, LBL	Test heat exchange ventilators					x													x
10	DOE/CS	Craig Hollowell, LBL John Janssen, Honeywell	Evaluate automatic variable ventilation control system.					x													

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11	DOE/CS	Craig Hollowell, LBL	Test control devices in chambers research house, and field.					x		x	x		x		x						x
12	DOE/CS	A. George, D. Sinclair, E. Knutson, Environmental Measurements Lab.	Measurement of size distribution of Rn daughter particles.		x					x					x						
13	DOE/CS	David Grimsrud, LBL	Automated infiltration measurement system.		x																
14	DOE/CS	David Grimsrud, LBL	Infiltration-pressurization model	x																	
15	DOE/CS	William S. Cain, John B. Pierce Foundation	Chamber evaluation of effects on humans of various factors and contaminants.			x		x										x			x
16	DOE/CS	J.E. Janssen, Honeywell, Inc.	Control ventilation by sensing CO_2 and temperature.					x													x
17	DOE/EV	Craig Hollowell, LBL Greg Traynor, LBL	Characterization and assessment of combustion appliance pollutants.			x			x												x
18	DOE/EV	Craig Hollowell, LBL Anthony Nero, LBL	Radon characterization; experimental home.	x					x	x					x						
19	DOE/EV	Anthony Nero, LBL Craig Hollowell, LBL	Health significance of radon exposures.			x	x			x											
20	DOE/EV	H. Franklin & A. George, Environmental Measurements Laboratory	Procedure for measuring ventilation and infiltration.		x																

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21	DOE/EV	[illegible] D. Zak, Sandia National Laboratories	Assessment of indoor air quality controls.						x												x
22	DOE/EV	J. Rundo, Argonne National Laboratories	Determination of Rn levels in residences as function of time.	x					x	x											
23	DOE/EV	John A. Pickrell, Lovelace Inhalation Toxicology Res. Institute	Investigation of formaldehyde binding in the nasal cavity.			x							x								
24	DOE/EV	K.R. Long, C.W. Frank, U. of Iowa, Inst. of Agr. Med. and Env. Health	Temperature and humidity effects on HCOH emissions from UF foam insulation.	x					x				x								
25	DOE/OHER	D.D. Schuresko, ORNL	Develop automated microfluorometry for personal monitoring.	x	x											x	x				
26	DOE/OHER	Alan Hawthorne, ORNL	Develop field-portable UV absorption spectrometer.		x						x					x					x
27	DOE/OHER	Alan Hawthorne, ORNL	Develop portable self-contained quadrapole mass spectrometer.		x											x					x
28	DOE/OHER	Tuan vo-Dinh and R.B. Grammage, ORNL	Develop paper filter sampling technique for PNA vapors.		x											x	x				
29	DOE/OHER	Tuan Vo-Dinh, ORNL	Develop colorimetric test method for nitrosamines.		x											x					
30	DOE/OHER	Tuan Vo-Dinh, ORNL	Develop synchronous luminescence method for PNA analysis.		x											x					

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31	DOE and CPSC	Thomas Matthews and D.D. Schuresko, ORNL	Development of portable Raman spectrometer for hazaradous gases.	x	x																x
32	EPA/ORP	Lee Ziegler, David Bernhardt, Phil Nyberg, EPA/ORP/Las Vegas	Develop Rn measurement techniques; build Rn data base.	x	x				x	x											
33	EPA/ORP	Phil Nyberg, Lee Ziegler, David Bernhardt, EPA/ORP/Las Vegas	Evaluate, calibrate, and improve Rn measurement techniques.	x	x					x											
34	EPA/ORP	D. Bernhardt, EPA/ORP/Las Vegas	Evaluate Rn field monitoring devices.	x	x					x											
35	EPA/ORP	Larry Lloyd, Montana DHES	Identification and assessment of radon sources in Butte, Montana.	x					x	x											
36	EPA/ORP	James E. Gingrich, Teradex Corporation	Provide Tract Etch detectors and readout services.	x	x					x											
37	EPA/ORP	Tony Stonehill, American ATCON	Demonstration of radon entry prevention and remedial techniques.					x		x											
38	EPA/ORP	Sam Windham, Eastern Env. Radiation Facility	Evaluate effectiveness of electronic air cleaners in removing radon.					x		x											
39	EPA/ORP	Wayne Cassott, NBS	Investigation of radon transport through building materials.						x	x											
40	EPA/ORP	E. Martell, National Center for Atmospheric Research	Interaction of radon decay products with particulates, surfaces, and gases.						x	x					x						

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41	EPA/ORP	Melvin First, Harvard School of Public Health	Effect of indoor air circulation on radon decay product concentration.						x	x											
42	EPA/ORP		Age-specific human respiratory cytometrics.			x															
43	EPA/ORP	Stanley W. Ferguson, Colorado Dept. Health	Study of excess cancer in Mesa County, Colorado.			x				x											
44	EPA/ORP	J.D. Mortenson, U. of Utah Research Institute	Age-specific human respiratory morphometrics.			x															
45	EPA/ORP	Stanley W. Ferguson, Colorado Dept. Health	Radon community cytology study.			x				x											
46	EPA/ORP	Herman Chernoff, MIT	Determine feasibility of an epidemiological study of health effects of radon in water.			x				x											
47	EPA/ORP	Larry Lloyd, Montana DHES	Evaluate Radon decay products measurement methods in Butte, Montana.	x						x											
48	EPA/ORP	Larry Lloyd, Montana DHES	Evaluation of radon decay product remedial techniques in Butte, Montana.					x		x											
49	EPA/ORP	R. Douglas, D. Bernhardt, Joe Hans, ORP-LV	Indoor radon studies in support of states.	x						x											
50	EPA/ORP	C.T. Hess, U. of Maine	Evaluation of spray aeration for Rn removal from water supplies.					x		x											

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51	EPA/OMTS	Robert O. Woods, Sandia Nat. Laboratories	Develop portable, self-contained monitoring system with selectable modules.	x	x																x
52	EPA/OMTS	Walter L. Zielinski, NBS	Development of personal exposure measurement devices.	x	x						x				x	x					
53	EPA/OMTS	George Yamate, IITRI	Evaluate provisional method for measurement of airborne asbestos.	x										x							
54	EPA/OMTS	J. Small, NBS	Development of asbestos reference materials; workshop on standards.	x										x							
55	EPA/OMTS	D.E. Lentzer, RTI	Write up protocol and develop round robin for measurement of bulk asbestos by polarized light and x-ray diffraction.	x										x							
56	EPA/OMTS	Robert Bradway, GCA/ Technology Division	Monitoring indoor air contaminants in 66 homes in Love Canal area.	x												x					x
57	EPA/OMTS	Joseph J. Brooks, Monsanto Research Corp.	Develop three-sorbent portable sampling system.	x	x											x					
58	EPA/OMTS	George Wooten, Monsanto Research Corp.	Develop passive dosimeter for multi-organic vapors.	x	x											x					
59	EPA/OMTS	Richard Ziskind, SAI	Pilot study of personal exposure CO monitoring, nine persons.	x					x			x									
60	EPA/OMTS	Ralph Sullivan, Xonics Inc.	Indoor-outdoor air monitoring 8 homes one week.	x					x												x

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61	EPA/OMTS	Edo Pellizzari, RTI	Total exposure assessment methodology study.	x					x												x
62	EPA/OHR	K.E. MacLeod, EPA/HERL/RTP	Sampling pesticide vapors in treated homes.						x							x					
63	EPA/OHR	K.E. MacLeod, EPA/HERL/RTP	Sampling 10 U.S. homes for semi-volatile organic pollutants.						x							x					
64	EPA/OHR	Douglas W. Bristol, EPA/HERL/RTP	Determination of PCP levels in treated log home and in residents													x					
65	EPA/OHR	James Flanagan, Rockwell International	Evaluation of personal air quality monitors.	x							x	x			x				x		x
66	EPA/OHR	Michael D. Lebowitz, U. of Arizona	Acute & chronic effects of indoor and outdoor exposures of air pollutants in Tucson.			x					x	x			x				x	x	x
67	EPA/OHR	V.F. Garry, A. Barksdale, U. of Minn. Stone Laboratory	Develop clinical methodology for detection effects of formaldehyde on humans.			x							x								
68	EPA/OHR	James A. Frazier, NRC	General assessment of indoor air pollution.			x		x	x	x	x	x	x	x	x	x	x				x
69	EPA/OHR	Stephen W. Connelly, TRC Environmental Consultants	Methodology to calculate hourly peak and total 24-hour individual exposure.						x		x	x									x
70	EPA/OEET	D.J. Moschandreas, Geomet	Formulation of national indoor air research plan.																		x

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71	EPA/OEET	D.J. Moschandreas; Geomet	Model 24-hour exposures of various population exposures.	x					x												x
72	EPA/Region V	Henry Anderson, Wisc. Div. of Health	Monitoring formaldehyde & other contaminants in 140 mobile homes.	x		x							x								x
73	NIOSH and EPA	William H. Hedley, Monsanto Research Corp.	Worker (24-hour) exposure and control technology study for workers in formaldehyde production.	x	x			x	x				x								x
74	NIOSH and EPA	Ralph Mitchell, Battelle Columbus Laboratory	Worker (24-hour) exposure and control technology study for workers in electronic components manufacturing.	x	x			x	x												x
75	EPA-Interagency Common H&E Effects of Energy Technology	Richard D. Brown, MITRE	Research needs in homes with oil and gas combustion.							x	x	x									x
76	EPA/ONAC	David Keast, Bolt, Berenak & Newman, Inc.	Demonstration of quiet, energy-efficient house.					x													x
77	NIOSH & TSI Inc.	Jugal Agarwal, TSI, Inc.	Development of aerosol size distribution instrument.	x	x										x						
78	NIOSH	M [illegible] Woebkenberg, NIOSH	Evaluation of personal exposure monitoring systems.	x	x						x	x									
79	NIOSH	J. Smith, NIOSH	Evaluation of in-plant control monitoring systems.	x	x																x
80	NIOSH	Jan Stohurst, Pierce Foundation	Development of optical monitor for asbestos in air.	x	x									x							

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81	NIOSH	J. Bowman, NIOSH	Development of certification criteria for mine dust samplers.	x											x						
82	NIOSH	P. Baron, NIOSH	Develop asbestos generator and counter; develop dust monitoring equipment.	x	x									x							
83	NIOSH	National Academy of Sciences	Study of monitoring instrument needs and government involvement.	x	x																
84	NIOSH	G. Brewer, NIOSH	Develop portable mass spectrometer		x																x
85	NIOSH	L. Doemeny, NIOSH	Develop miniature gas chromatograph.		x																x
86	NIOSH	M '. Woebkenberg, NIOSH	Develop passive monitors and sensors for toxic substances while worker wears respirator.		x						x										x
87	NIOSH	P. Baron, NIOSH	Instrumentation training for industrial hygiene personnel.		x																x
88	NIOSH	J. Smith, NIOSH	Assess methods to determine worker exposure to PNA.	x												x					
89	NIOSH	J. Bowman, NIOSH	Develop monitoring and sampling strategies for coal mine dust.	x											x						
90	NIOSH	Hugh L. Evans, NYU Medical Center	Test new assays for neurotoxicity of organic solvents.			x										x					

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				MONITORING	INSTRUMENTATION	HEALTH EFFECTS	RISK ASSESSMENT	CONTROL TECHNOLOGY	CHARACTERIZATION	RADON	NO_x	CO	HCOH	ASBESTOS	RSP	ORGANICS	TOBACCO SMOKE	ODOR	OZONE	BIOLOGICAL	MULTI-POLLUTANT
91	NIOSH	Henry A. Anderson, Wisc. Div. of Health	Assessment of asbestos hazard in schools and other buildings.					x	x					x							
92	NIOSH	J. Smith, NIOSH	Develop research pian for worker alert monitoring systems, work practices, process modifications.					x													x
93	NIEHS/OHHA	Toxicology Information Response Center, ORNL	Bibliography entitled "Health Aspects of Urea Formaldehyde Compounds."			x							x								
94	DHHS/DFEOH	Victor Avitta, DFEOH	Investigation of office health complaints.						x												x
95	NIEHS and EPRI	Benjamin G. Ferris, Jr. Harvard School of Public Health	Evaluate effects of low levels of SO_2 and PSP on human health			x					x				x						
96	CPSC	Harry I. Cohen, CPSC	Proposed regulations for urea-formaldehyde insulation.										x								
97	CPSC	Harry I. Cohen, CPSC	Investigation of formaldehyde complaints re building materials.										x								
98	CPSC	Harry I. Cohen, CPSC	Identification of consumer products involved in indoor air pollution.					x								x					x
99	CPSC	Rory S. Fausett, CPSC	Review of health effects from consumer product emissions.			x										x		x			x
100	CPSC	Rory S. Fausett, CPSC	Analysis of combustion products from heaters and stoves.						x		x	x	x								x

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101	CPSC	Alan Hawthorne, ORNL	Develop passive membrane dosimeter for formaldehyde.		x								x								
102	CPSC	Thomas G. Matthews, ORNL	Develop 13x molecular sieve as solid adsorbent sampler for formaldehyde.		x								x								
103	CPSC	Thomas G. Matthews, ORNL	Modify CEA Instruments Model 555 analyzer for real-time formaldehyde monitoring.	x	x								x								
104	CPSC	Donald E. Adams, Calspan Corp	Feasibility of carbon monoxide hazard safety system for home heating systems.					x				x									
105	CPSC	J.A. Pickrell, Lovelace	Relate HCOH outgassing to free and hydrolizable HCOH in UF products.	x					x				x								
106	HUD	Jaswant Singh and Richard Walcott, Clayton Envir. Consultants	Propose and validate formaldehyde monitoring method in up to 250 mobile homes.	x	x								x								
107	HUD	Robert F. Stone, Technology and Economics, Inc.	Evaluation of formaldehyde in residential mobile homes.						x				x								
108	HUD	D.J. Moschandreas, Geomet	Literature review of formaldehyde problems in mobile homes.						x				x								
109	HUD	Larry Lloyd, Montana DHES	Develop, demonstrate, evaluate radon hazard mitigation techniques.					x		x											

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110	HUD	Donald Hausknecht, Science Applications, Inc.	Assess impact of radiation and standards on HUD housing and community development activities.					x		x											
111	USAF	Peter A. Lurker, USAF Occupational & Env. Health Lab.	Develop toxicological exposure protocol for composite graphite fibers.	x											x						
112	USAF	Thomas H. Lillie, USAF Occupational & Env. Health Lab.	Sampling for chlordane in military housing units.	x					x							x					
113	USN	Alfred H. Lowrey, USN Research Laboratory	Modeling enclosed air space						x												x
114	US Army	R.F. Goldman, U.S. Army Res. Inst. of Environ. Medicine	Characterization of thermal effects of indoor air.			x															
115	USDA, Forest Products	Gary F. Maciel, Colorado State U.	Develop solid sample NMR techniques for UF polymers.		x								x								
116	USDA	George E. Myers, Forest Products Laboratory	Improvement of urea-resin bond performance.					x					x								
117	USDA	George E. Myers, Forest Products Laboratory	Evaluation of techniques to characterize HCOH emissions of plywood and particle board.	x					x				x								
118	DOI/OWRT	C.T. Hess, S.A. Norton, W.F. Brutsaert, D. Lowry, U. Maine	Assess radionuclide distribution in Maine ground water.	x				x	x	x											
119	DOI/BuM	Pedro Lilienfeld, GCA	Personal dust exposure monitor	x	x										x						

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120	Nuclear Regul. Commission	C.C. Travis, ORNL	Estimates of Rn exposure to residents of U.S., Canada and Mexico, from uranium mills and other sources.						x	x											
121	NAS/NRC	J.D. Hackney, Rancho Los Amigos Hospital	Health efffects of likely specific pollutants found indoors.			x															x
122	FAA	C.E. Melton, Jr., Civil Aero-medical Institute	Study of ozone effects under simulated flight conditions.			x													x		
123	FAA	C.E. Melton, Jr., Civil Aero-medical Institute	Effects of ozone on pilots under simulated flight conditions.			x													x		
124	NSF	S.K. Friedlander, UCLA, M.P.Sinha and C.E. Griffin, JPL.	Measurement of chemical composition of aerosol particles continuously	x	x										x						x
125	Solar Energy Research Institute	Michael B. Rogozen, SAI	Model indoor Rn buildup from solar heat rock storage systems.						x	x											
126	Solar Energy Research Institute	Linda Scott, St. Olaf's College	General assessment of indoor air pollution and research needs.						x												x
127	IRLG	Richard Dailey, EPA	Risk assessment of formaldehyde			x	x						x								
128	Nat'l Institute of Building Sciences	D. Michael Murtha, Assoc. Gr. Study of Man-Environment Relations.	Workshop on building information																		

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129	ASHRAE	Frank Jarke, IITRI	Develop method to test filter media effectiveness in removing tobacco smoke.					x									x				
130	ASHRAE	Amon Birenzrige, TRC	Development of test method to evaluate gas and odor control devices.	x	x												x	x			
131	ASHRAE		Establish criteria and guidelines for air change rates in hospitals.					x													x
132	ASHRAE	James E. Woods, Iowa State U.	Ventilation requirements and criteria for hospital operating rooms.					x	x											x	x
133	ASTM	W.J. Rossiter, Jr., NBS	Preparation of standard specifications for foam insulation.					x					x								
134	Gas Research Institute	Frank Belles and D.W. DeWorth, Am. Gas. Assoc. Laboratories	Develop test for leaking furnace HX; develop guidance for NO_x emission reduction from high-efficiency burners.	x				x		x	x										
135	Gas Research Institute	H.D. Roth Associates, Inc.	Critical examination of the Harvard Six-City Study.			x															x
136	GRI	P.T. Harsha, R. Edelman, Science Applications, Inc.	Performances modeling of gas burner systems and other systems.						x	x	x	x			x	x					x
137	GRI	R.A. Macriss, IGT	Development of air infiltration model for dwellings.						x												x

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138	GRI	G. Stewart Young, A.D. Little Inc.	General assessment of indoor air quality vs. energy conservation measures.			x		x	x												x
139	EPRI	D.J. Moschandreas, Geomet	Comparison of indoor and outdoor air pollutant exposures.	x		x			x												x
140	Human Ecology Research Foundation of the SW	Robert Edgar, U. of Texas	Characterization of air quality in Brookhaven environmental unit.						x												x
141	Mobil Foundation	Amos Turk, City U. of N.Y.	Assessing performance of activates carbon adsorber.	x				x													x
142	American Health Foundation	D. Hoffman, Amer. Health Foundation	Chemical characterization of tobacco smoke.						x		x		x			x	x				
143	Chicago Lung Assoc.	R.A. Wadden & R.J. Allen, U. of Ill. School of Public Health	Characterization of ozone in inside environment.						x										x		
144	Society for Clinical Ecology	Francis Silver	Organoleptic methods for detection of outgassing.	x																	x
145	National Cancer Institute	Arthur L. Frank, Mount Siani School of Medicine	Mineral fiber size carcinogenicity *in vitro*.			x								x	x						
146	Ball State U. and Indiana Academy of Science	Thad Godish, Ball State U.	Evaluation of home complaints for formaldehyde contamination.	x		x		x					x								
147	U. of Illinois	Lucy Elam and R.A. Wadden, U. of Ill. School Public Health	Determination of NO_2 in side stream tobacco smoke.						x		x						x				

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148	U. of Illinois	M.V. Selway & R.A. Wadden, U. of Ill. School of Public Health	Ozone production from copying machines						x										x		
149	U. of Illinois	Annette Neal & R.A. Wadden, U. of Ill. School of Public Health	Evaluation of particulate levels hospital intensive care units.						x						x						
150	Temple University	Agnes B. Kane, Temple U. School of Medicine	Pathogenesis of mineral (silica) dust toxicity.			x									x						
151	State U. of N.Y. State U. Construction Fund	Samuel Syrofynski, N.Y.S, Dept. of Health	Assessment of asbestos problem in State University buildings.					x	x					x							
152	TSI Inc.	Fred Quant, TSI Inc.	Development of automated respirable aerosal mass monitor.	x	x										x						
153	Honeywell, Inc.	J. Garfunkel, Honeywell, Inc.	Develop gas detection devices.		x						x	x				x					x
154	Honeywell, Inc.	**Honeywell, Inc., Residential** Division	**Electronic air cleaning and smoke** detection.					x													x
155	Honeywell, Inc.	U. Bonne, J.E. Janssen, Honeywell, Inc.	Indoor combustion modeling, effect on ventilation of air consumption.					x	x												x
156	Honeywell, Inc.	J.E. Janssen, Honeywell, Inc.	Energy conservation versus infiltration rates.						x												x
157	E.I. duPont deNemours	William J. Lautenberger, Applied Technology Division	Develop badges for measuring low levels of CO and formaldehyde.	x	x								x	x							

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158	E.I. duPont deNemours	William J. Lautenberger, Applied Technology Division	Develop badges for measuring low levels of SO_2, NO_x and NH_3.	x	x						x										x
159	Terradex Corp.	General Electric Co.	Develop configurations, tests, and calibrate tract etch system for radon.	x	x					x											
160	Thermo Electron Corp., Eberline Div.	R. Beard, Eberline Div. F. Fraine, Thermo Electron	Develop portable radon daughter working level monitor.	x	x					x											
161	Montana DHES	Larry Lloyd, Montana DHES	Assessment of Rn problem in Butte, Montana.	x			x	x		x											
162	Atomic Energy Control Board, Canada	P.J. Manley, MacLaren Engineers	Remedial measures in Bancroft, Ontario.					x		x											
163	Atomic Energy Control Board, Canada	W.O. Findlay, DSMA/ACRES/CAMARIAN	Remedial measures in Uranium City, Sasketchewan.					x	x	x											
164	Atomic Energy Control Board, Canada	B.C. Stonehill, SSMA/ACRES	Remedial measures in Elliot Lake, Ontario.					x	x	x											
165	Atomic Energy Control Board, Canada	E.J. Chart, MacLaren, Engineers	Remedial measures in Port Hope, Ontario.					x	x	x											
166	Dept. National Health Welfare, Canada	L.D. Pengelly, Dept. Medicine McMaster University	Characterization of air quality in schools and residences.	x					x		x				x						x
167	Legal Services Society of British Columbia	Elvia Sterling, Cornerstone Planning Group	Study of office conditions and health effects.			x															x

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168	Legal Serv. Society of British Columbia	Elia Sterling, Cornerstone Planning Group	Implement and monitor office lighting and air supply.	x				x													x
169	Simon Fraser University	T.D. Sterling, Simon Fraser U.	Continuing review of levels of indoor pollutants.						x												x
170	Agricultural University Wageningen, Netherlands	Erik Lebret, Bert Brunekreef, Agricultural University	Characterization of residential indoor air quality.					x	x			x			x						x
171	United Nations Environmental Programme	H.W. deKoning, WHO	5 pilot studies to develop techniques for assessing human exposure to air pollutants.	x		x															x

INV. NO. 1

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Field Monitoring

Start Date: 1977 **End Date:**

Funding Level: **FY 80** $556K **FY 81** $550K **FY 82**

Project Officer:	**Principal Investigator:**
Name: Howard Ross	**Name:** Craig Hollowell & James Berk
Organization: Department of Energy	**Organization:** Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, DC 20585	**Address:** Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 252-9187	**Phone:** 415 / 486-6591

Abstract: Using a mobile laboratory, detailed indoor air quality measurements are being conducted in the following building types: an earth-covered residence, a residence using a wood-burning stove as its primary heat source, homes with heat exchangers, pre and post retrofit homes, mobile homes, homes designed to be particularly energy efficient, schools, and office buildings planning to operate using energy efficient ventilation rates.

References to Completed Work:

INV. NO. 2

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Indoor Air Quality Modeling

Start Date:

End Date:

Funding Level: **FY 80** 0 **FY 81** 0 **FY 82**

Project Officer:	**Principal Investigator**:
Name: Howard Ross	**Name**: Craig Hollowell & Greg Traynor
Organization: Department of Energy	**Organization**: Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, D.C. 20585	**Address**: Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 252-9187	**Phone**: 415 / 486-6593

Abstract: Develop and validate a house-specific IAQ model which will predict indoor concentrations based on input information such as source strengths, ventilation rate, time profiles, pollutant reactivities etc. Validate this model in a research house. Develop the theoretical framework for a national IAQ model which will incorporate existing national data on IAQ parameters, identify areas requiring collection of data, and predict indoor air pollution levels for the national housing stock.

References to Completed Work:

INV. NO. 3

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Odors

Start Date: 1978 **End Date:** 1980

Funding Level: FY 80 $122K FY 81 0 FY 82

Project Officer:	**Principal Investigator:**
Name: Howard Ross	**Name:** C. Hollowell, W. Cain, W. Duffey
Organization: Department of Energy	**Organization:** Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, D.C. 20585	**Address:** Lawrence Berkeley Lab., John Pierce Found., & TRC Berkeley, CA 94720
Phone: 202 / 252-9187	**Phone:** 415 / 486-6191

Abstract: Perform laboratory studies to determine how odor magnitude, odor acceptability, and odor detectability vary with the rate and type of contaminant generation, rate of ventilation, temperature and humidity. Compare air acceptability as perceived by occupants and visitors. Perform field studies to determine ventilation requirements for odor control in public buildings. Assess odorant identities, odorant concentrations, and the significance of tabacco smoke on odor magnitude and acceptability.

References to Completed Work:

INV. NO. 4

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Microbial Burden Studies

Start Date: 1977 **End Date:** 1979

Funding Level FY 80 $10K FY 81 0 FY 82

Project Officer:

Name: Howard Ross

Organization: Department of Energy

Address: Forrestal Bldg. Rm. GF 253
1000 Independence Ave. SW
Washington, D.C. 20585

Phone: 202 / 252-9187

Principal Investigator:

Name: C. Hollowell & M. Chatigny

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory &
Naval Biosciences Laboratory
Berkeley, CA 94720

Phone: 415 / 486-6591

Abstract: Perform field studies to determine whether energy-conserving changes in ventilation practices would lead to unacceptable levels of airborne microbes. Sample and assay bacterial content of the air in educational facilities and hospitals under energy efficient ventilation conditions.

References to Completed Work:

INV. NO. 5

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Hospital Standards

Start Date: 1977 End Date: 1979

Funding Level: FY 80 $10K FY 81 0 FY 82

Project Officer:
Name: Howard Ross
Organization: Department of Energy
Address: Forrestal Bldg. Rm. GF 253
1000 Independence Ave. SW
Washington, D.C. 20585
Phone: 202 / 252-9187

Principal Investigator:
Name: Craig Hollowell & Robert Banks
Organization: Univ. of California
Address: Lawrence Berkeley Laboratory
and Univ. of Minnesota
Berkeley, CA 94720
Phone: 415 / 486-6591

Abstract: Develop energy-conservation strategies that do not compromise the health, safety, and comfort of hospital patients and staff. Support DOE/HHS efforts to promote energy-efficient ventilation and thermal standards for hospitals.

References to Completed Work:

INV. NO. 6

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Organic Contaminant Project

Start Date: 1978
End Date:

Funding Level: FY 80 $311K FY 81 $80K FY 82

Project Officer:

Name: Howard Ross
Organization: Department of Energy
Address: Forrestal Bldg. Rm. GF 253
1000 Independence Ave. SW
Washington, D.C. 20585
Phone: 202 / 252-9187

Principal Investigator:

Name: Craig Hollowell & Robert Miksch
Organization: Univ. of California
Address: Lawrence Berkeley Laboratory
Berkeley, CA 94720
Phone: 415 / 486-6591 (FTS 451-6591)

Abstract: Characterize indoor organic contaminants and correlate findings with measured organic emissions from building materials. Specific topics addressed include:

- Measurement of formaldehyde levels using chromotropic acid and pararosaniline.
- Development of formaldehyde passive monitors.
- Development of a field sampling system for organic contaminants using the porous polymer Tenax GC for collection and techniques such as GC-FID and GC-MS for quantification and identification.
- Development of analysis methods for surveying and quantifying organic contaminant emissions from building materials.

References to Completed Work:

INV. NO. 7

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Radon Studies

Start Date: 1978 End Date:

Funding Level: FY 80 $250K FY 81 $160K FY 82

Project Officer:	**Principal Investigator:**
Name: Howard Ross	Name: Craig Hollowell & Anthony Nero
Organization: Department of Energy	Organization: Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, D.C. 20585	Address: Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 252-9187	Phone: 415 / 486-6593

Abstract: Study the effects of energy conservation measures in buildings on indoor concentrations of radon and its radioactive decay products. Develop monitoring instrumentation and make laboratory and field measurements of source strengths and concentrations in conventional and energy efficient housing including the testing of control strategies. Assess the suitability of various monitoring instrumentation for field application.

References to Completed Work:

INV. NO. 8

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Field Instrumentation

Start Date: 1979

End Date:

Funding Level: FY 80 $32K FY 81 $75K FY 82

Project Officer:

Name: Howard Ross

Organization: Department of Energy

Address: Forrestal Bldg. Rm. GF 253
1000 Independence Ave. SW
Washington, DC 20585

Phone: 202 / 252-9187

Principal Investigator:

Name: Craig Hollowell & Greg Traynor

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory
Berkeley, CA 94720

Phone: 415 / 486-6591

Abstract: Develop a full range of low-cost (optimally passive) instruments to aid in the assessment of indoor air quality and the parameters which affect it. Develop a portable package suitable for large scale audits, requiring no external power, containing a carbon monoxide monitor, a fine particulate monitor, and devices to measure relevant indoor air quality parameters such as infiltration rate. Develop a more sophisticated package requiring external power suitable for more detailed indoor air quality research programs. Initial emphasis is on the development of carbon monoxide and formaldehyde passive monitors.

References to Completed Work:

INV. NO. 9

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Residential Building Ventilation Systems - Heat Exchangers

Start Date: 1978 **End Date:**

Funding Level: FY 80 $304K FY 81 $300K FY 82

Project Officer:	**Principal Investigator:**
Name: Howard Ross	**Name:** Craig Hollowell & Gary Roseme
Organization: Department of Energy	**Organization:** Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, D.C. 20585	**Address:** Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 252-9187	**Phone:** 415 / 486-6591

Abstract: Test the thermal performance, leakage, and cross contamination for heat exchange units from U.S. and foreign manufacturers. Model theoretical heat exchange performance and develop standard test methods for measuring thermal performance. Field test heat exchange systems for effectiveness in reducing indoor air quality problems and model cost-benefit of heat exchange systems for several residences in various climate zones.

References to Completed Work:

INV. NO. 10

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Automatic Variable Ventilation Control Systems

Start Date: 1979

End Date: 1980

Funding Level: FY 80 $152K FY 81 0 FY 82

Project Officer:

Name: Howard Ross

Organization: Department of Energy

Address: Forrestal Bldg. Rm. GF 253
1000 Independence Ave. SW
Washington, D.C. 20585

Phone: 202 / 252-9187

Principal Investigator:

Name: Craig Hollowell & John Janssen

Organization: Univ. of California

Address: Lawrence Berkeley Lab. &
Honeywell Corporation
Berkeley, CA 94720

Phone: 415 / 486-6591

Abstract: Complete a variable ventilation demonstration in a junior high school. Vary the outdoor air supply rate with indoor carbon dioxide concentration as the controlling parameter. Assess the potential for commercialization of such a system.

References to Completed Work:

INV. NO. 11

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Contaminant Control Techniques

Start Date: 1980 **End Date:**

Funding Level: FY 80 $8K FY 81 0 FY 82

Project Officer:	**Principal Investigator:**
Name: Howard Ross	**Name:** Craig Hollowell
Organization: Department of Energy	**Organization:** Univ. of California
Address: Forrestal Bldg. Rm. GF 253 1000 Independence Ave. SW Washington, D.C. 20585	**Address:** Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 252-9187	**Phone:** 415 / 486-6591

Abstract: Survey indoor pollutant control devices and sealants for formaldehyde, radon, particulates, NO_2, and other indoor pollutants. Test the effectiveness of control devices in a test chamber, a research house, and field studies.

References to Completed Work:

INV. NO. 12

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/EV

Project Title: Measurement of Size Distribution of Radon Daughter Particles in Houses

Start Date: 1981 **End Date:** 1982

Funding Level: FY 80 ______ FY 81 ~ 1/2 man-yr FY 82 ______

Project Officer:	**Principal Investigator:**
Name:	**Name:** A. C. George, D. Sinclair and E. O. Knutson
Organization:	**Organization:** Department of Energy
Address:	**Address:** Environmental Measurements Lab. 376 Hudson Street New York, NY 10014
Phone: /	**Phone:** 212 / 620-3654

Abstract: For the proper calculation of lung dose from radon daughter particles the entire size spectrum of the radioactive aerosol, including both the attached and unattached fractions, must be obtained. Relatively little data are available because of lack of instrumentation and the difficulty in measuring submicron particles. The Environmental Measurements Laboratory pioneered the development of special diffusion batteries which can be applied in the characterization of indoor environments.

References to Completed Work: George, A.C., and Breslin, A.J., "The Distribution of Ambient Radon and Radon Daughters in Residential Buildings in New Jersey-New York Area", Natural Radiation Environment III, Vol. 2, CONF-780422 (1980).

INV. NO. 13

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Automated Infiltration Measurement System (AIM)

Start Date: October, 1979   End Date: September, 1981

Funding Level: FY 80 $15K   FY 81 $36K   FY 82

Project Officer:

Name: Howard Ross

Organization: Department of Energy

Address: Bldgs. Div, Mail Stop GH-068
1000 Independence Ave. SW
Washington, D.C. 20585

Phone: /

Principal Investigator:

Name: David Grimsrud

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory
Bldg. 90, Rm 3078
Berkeley, CA 94720

Phone: 415 / 486-4023

Abstract: A passive infiltration measurement system is under development that will measure average infiltration rates for variable lengths of time from two days to a month. The device uses SF_6 as a tracer gas, injecting a constant rate for the measurement period. Samples of air in the test space are collected continuously during the measurement period. At the end of this time the air sample is shipped to a laboratory for analysis. Preliminary field measurements are underway.

References to Completed Work: Sherman, M.H., Grimsrud, D.T., Condon, P.E. and Smith, B.V. (1980). Air Infiltration Measurement Techniques. Presented at the First International Energy Agency Symposium, Windsor, England. Lawrence Berkeley Laboratory Report LBL-10705.

INV. NO. 14

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/CS

Project Title: Infiltration - Pressurization Correlations

Start Date: June, 1978 **End Date:** September, 1980

Funding Level: **FY 80** $175K **FY 81** $175K **FY 82**

Project Officer:	**Principal Investigator:**
Name: Howard Ross	**Name:** David Grimsrud
Organization: Department of Energy	**Organization:** Univ. of California
Address: Bldgs. Div, Mail Stop GH-068 1000 Independence Ave. SW Washington, D.C. 20585	**Address:** Lawrence Berkeley Laboratory Bldg. 90, Rm. 3078 Berkeley, CA 94720
Phone: /	**Phone:** 415 / 486-4023

Abstract: We have developed a model that predicts infiltration in single-family dwellings based upon local weather conditions and a quantity measured using fan pressurization, the effective leakage area. The effective leakage area characterizes the infiltration in much the same way as the average R-value of a wall characterizes conduction loss. The model has been validated using houses located in many regions of the country. Additional field studies are underway.

References to Completed Work: Sherman, M.H., and Grimsrud, D.T. (1980). Measurement of Infiltration Using Fan Pressurization and Weather Data, presented at the First International Energy Agency Symposium of the Air Infiltration Center, Windsor, England. Lawrence Berkeley Laboratory Report LBL-10852

INV. NO. 15

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Lawrence Berkeley Lab/DOE

Project Title: Energy Efficient Ventilation Standards: Requirements for Odor Control

Start Date: October, 1978 End Date: Present

Funding Level: FY 80 ≈ $70K FY 81 ≈ $70K FY 82

Project Officer:

Name: Dr. Isaac Turiel

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory
Bldg. 90-3058
One Cyclotron Road
Berkeley, CA 94720

Phone: /

Principal Investigator:

Name: William S. Cain

Organization: John B. Pierce Foundation

Address: John B. Pierce Foundation Lab.
290 Congress Avenue
New Haven, CT 06519

Phone: /

Abstract: The project began with a review of the literature on ventilation and odor control. During that period, we built an aluminum-lined environmental chamber that allowed us to make a physical and psychophysical assessment of contaminants generated during occupancy of up to 12 persons. The chamber has subsequently been used to collect more than 10,000 person-hours of data on how odor intensity and acceptability vary with density of occupancy, rate of ventilation, temperature, humidity, duration of occupancy, presence of filter media, and presence of smoking. The experiments permit us to compare the reactions of occupants to those of visitors. In addition to odor, other indices of acceptability that have been given attention include apparent temperature, humidity, and stuffiness.

References to Completed Work: Cain, W.S., Berglund. L.G., Duffee, R.A., & Turk, A., Ventilation and odor control: Prospects for energy efficiency. Lawrence Berkeley Laboratory Report LBL-9578, November, 1979.

INV. NO. 16

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Lawrence Berkeley Laboratory

Project Title: Controlled Ventilation

Start Date: 4-25-79

End Date: 9-30-80 (Extension requested)

Funding Level: FY 80 $160K FY 81 FY 82

Project Officer:

Name: Dr. Isaac Turiel

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory
Bldg. 90, Room 3058D
Berkeley, CA 94720

Phone: /

Principal Investigator:

Name: D.N. Carlson, Program Manager
J.E. Janssen, Pri. Investigator

Organization: Honeywell Inc., TSC

Address: 1700 W. Highway 36
St. Paul, MN 55113

Phone: 612 / 378-4162
612 / 378-4937

Abstract: The ventilation system in a school was modified so that CO_2 level is sensed and outdoor air is admitted only when CO_2 level or temperature reach the control set point. This can save about 25% in heating energy in Northern climates. It was found that occupants felt warmer when the CO_2 level is raised to 0.25%, the concentration that forms the basis for the ASHRAE Ventilation Standard. Incomplete mixing of room and ventilation air reduced ventilation efficiency to about 75%.

References to Completed Work:

INV. NO. 17

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/EV

Project Title: Combustion Appliances

Start Date: 1975   End Date: Continuing

Funding Level: FY 80 $150K   FY 81 $190K   FY 82

Project Officer:

Name: John Viren

Organization: Department of Energy

Address: Office of Health and
Environmental Research
E-201 Germantown
Washington, D.C. 20545

Phone: 202 / 233-4739

Principal Investigator:

Name: Craig Hollowell & Greg Traynor

Organization: Univ. of California

Address: Lawrence Berkeley Laboratory
Berkeley, CA 94720

Phone: 415 / 486-6591

Abstract: Characterize indoor pollution resulting from combustion appliance emissions for various appliance types and ventilation rates. Study the fate of these pollutants in buildings, schemes for their control, their health risks, and the impact of various energy conservation strategies in buildings.

References to Completed Work:

INV. NO. 18

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/EV

Project Title: Radon Characterization

Start Date: 1980		End Date:	
Funding Level: FY 80	0	FY 81 $150K	FY 82

Project Officer:	Principal Investigator:
Name: Wayne Lowder	Name: Anthony Nero & Craig Hollowell
Organization: Department of Energy	Organization: Univ. of California
Address: Physical & Technological Programs Div. of Biomedical and Environmental Research 20 Massachusetts Ave. NW Washington, D.C. 20545	Address: Lawrence Berkeley Laboratory Berkeley, CA 94720
Phone: 202 / 233-5364	Phone: 415 / 486-6591

Abstract: Study sources and concentrations of indoor radon and its radioactive decay products, emphasizing the factors affecting airborne daughter concentrations. Establish a research home instrumented to monitor such relevant parameters as air exchange rate, radon concentration, individual daughter concentrations, particulate size distributions, temperature and humidity. Perform dynamic experiments to test measurement methods and control techniques.

References to Completed Work:

INV. NO. 19

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/EV

Project Title: Radon Risk Assessment

Start Date: 1979

End Date:

Funding Level: FY 80 $50K FY 81 $50K FY 82

Project Officer:

Name: John Viren

Organization: Department of Energy

Address:
Office of Health and
Environmental Research
E-201 Germantown
Washington, D.C. 20545

Phone: 202 / 233-4739

Principal Investigator:

Name: Anthony Nero & Craig Hollowell

Organization: Univ. of California

Address:
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Phone: 415 / 486-6591

Abstract: Examine the health significance of indoor exposure to radon daughters. Assess the concentrations to which the public is now exposed and the changes in exposure that would result from implementation of various energy conservation programs and/or radon control strategies. Estimate the implications of these exposures based on available epidemiological information.

References to Completed Work:

INV. NO. 20

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE-EV

Project Title: Develop Standardized Procedures and Instrumentation for Measuring Ventilation and Infiltration Rates in Dwellings

Start Date: April, 1981

End Date: April, 1982

Funding Level: **FY 80** ______ **FY 81** 1/2 man-yr **FY 82** ______

Project Officer:

Name: ______

Organization: ______

Address: ______

______

______

Phone: ______/______

Principal Investigator:

Name: H. Franklin and A. George

Organization: Department of Energy

Address: Environmental Measurements Laboratory
376 Hudson Street
New York, NY 10014

Phone: 212 / 620-3654

Abstract: In view of the possibility that indoor air pollutants could be raised to dangerous levels by efforts to comply with energy conservation standards, there is a need to develop standardized procedures and instrumentation to permit accurate ventilation measurements. Ventilation measurement studies will be initiated in a laboratory setting, utilizing a 400 ft^3 air flow test chamber to evaluate commonly used and innovative methods. A field test program, involving conventional and "tight" houses will be conducted to assess the ventilation measurement techniques and determine procedural recommendations.

References to Completed Work:

INV. NO. 21

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Environmental & Safety Engineering Division

Project Title: Energy-Related Environmental Control Studies

Start Date: Continuing **End Date:**

Funding Level: **FY 80** **FY 81** **FY 82**

Project Officer:

Name: John Mathur
Organization: Department of Energy
Address: Mail Stop E-201
Office of Environment
Washington, D.C. 20545
Phone: 301 / 353-5511

Principal Investigator:

Name: B. D. Zak
Organization: Sandia National Labs.
Address: Environmental Research
Division/4533
Albuquerque, NM 87185
Phone: 505 / 844-7328

Abstract: The objective of this project is to assure that environmental control technology needs of selected innovative energy technologies are adequately met when these technologies are ready for application. This requires that the needs be identified, that available controls be assessed relative to both effectiveness and cost, and that if available controls are inadequate, that this be made known to DOE so that appropriate measures can be taken to develop the required controls. A secondary objective is to facilitate the implementation of needed controls by informing technology users of these needs through publications, pamphlets, or handbooks widely distributed among the targeted technology users. For FY 81, two tasks are relevant: 1. Environmental Controls for Indoor Air Quality in Energy Efficient Buildings; and 2. Environmental Controls for wood combustion and other fuels.

References to Completed Work: SOLAR HEATING MATERIALS HANDBOOK: ENVIRONMENTAL AND SAFETY CONSIDERATIONS FOR SELECTION.

INV. NO. 22

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/EV

Project Title: Assessment of Natural Radon and Radon Daughters in U.S. Single Family Housing

Start Date: 1979 **End Date:**

Funding Level: FY 80 $40K FY 81 $141K FY 82

Project Officer:

Name: Dr. R. W. Wood

Organization: Department of Energy

Address: EV-34, OHER
Washington, D.C. 20545

Phone: 301 / 353-3213

Principal Investigator:

Name: Dr. J. Rundo

Organization: Argonne National Lab.

Address: 9700 S. Cass Avenue
Argonne, IL 60439

Phone: 312 / 972-4168

Abstract: In this research we are attempting to determine the average concentrations of radon and its short-lived radioactive daughter products in single-family houses. The reasons are twofold. First, it is now realized that the shortlived daughters of radon are responsible for the largest component of background radiation dose to the lung. Second, energy conservation measures to minimize ingress of outside air during the heating season will lead to an increase in radon concentration in houses. The approach is (a) to collect two or more samples of air from many houses, (b) to determine the radon concentration as a function of time (diurnal and seasonal variations) in small numbers of houses, and (c) to determine the concentrations of the radon daughters in different types of houses, also as a function of time. While the initial emphasis is on existing houses with conventional heating systems, energy efficient houses (e.g., those built underground) and those with solar-powered heating systems, will be investigated when the opportunity arises.

References to Completed Work: Health Physics 36(6), 729-730 (1979)
Argonne National Laboratory Report ANL-79-65(II), pp. 1-38 (1979)

INV. NO. 23

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE

Project Title: Indoor Air Pollution

Start Date:	7/15/80		**End Date:**	Not Specified	
Funding Level: FY 80	$25K	FY 81	$50K	FY 82	

Project Officer:		**Principal Investigator:**	
Name:	John A. Pickrell, DVM, PhD	**Name:**	John A. Pickrell, DVM, PhD
Organization:	Lovelace Inhalation Toxicology Research Institute	**Organization:**	Lovelace Inhalation Toxicology Research Institute
Address:	P.O. Box 5890 Albuquerque, NM 87116	**Address:**	P.O. Box 5890 Albuquerque, NM 87116
Phone:	505 / 844-7020	**Phone:**	505 / 844-7020

Abstract: We are investigating the local dosimetry for formalin which was inhaled and deposited in the nasal cavity. The binding of formaldehyde to macromolecules and to water will be studied. Finally, inhalation exposures will be done in rodent species both in normal health and sensitized to find out mechanism and extent of nasal binding.

References to Completed Work:

INV. NO. 24

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE

Project Title: Temperature and Humidity effects on the Emission of formaldehyde from urea formaldehyde foam insulation

Start Date: 1 July 1978 **End Date:**

Funding Level: FY 80 $70K FY 81 $1250K FY 82

Project Officer:

Name: Dr. Ted S. Lundy

Organization: Oak Ridge National Laboratories

Address: P.O. Box X
Oak Ridge, TN

Phone: 615 / 574-4347

Principal Investigator:

Name: K.R. Long, C.W. Frank

Organization: University of Iowa

Address: Institute of Agricultural Medicine & Environmental Health
College of Medicine
Oakdale, IA 52319

Phone: 319 / 353-4872

Abstract:

References to Completed Work: ORNL/SUB 7559/1

INV. NO. 25

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health & Environmental Research

Project Title: Development of Automated Microfluorometry for personal monitoring

Start Date: 01-01-79

End Date: Open

Funding Level: FY 80 $112K FY 81 $120K FY 82

Project Officer:

Name: Dr. R. W. Wood

Organization: Department of Energy

Address: Office of Health and Environmental Research
MSE-201
Washington, D.C. 20545

Phone: /

Principal Investigator:

Name: D. D. Schuresko

Organization: Oak Ridge National Laboratory

Address: Building 4500S, S-254
P.O. Box X
Oak Ridge, TN 37830

Phone: 615 / 574-6798

Abstract: The objective of this program is to develop several means for assaying human exposure to polynuclear aromatic hydrocarbon (PNA) compounds by measurement of the introduction of cytochrome P-450 enzyme system. The P-450 enzyme which metabolizes PNAs to excretable compounds is present in numerous tissues and organs including pulmonary macrophages, and its induction by pure PNA compounds, by cigarette smoke condensate, and by synthetic fossil fuels has been demonstrated. The methodology is applicable to indoor situations where inhalation exposure to cigarette smoke, to wood and coal combustion condensate, and to engine fumes is encountered.

References to Completed Work:

INV. NO. 26

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health and Environmental Research

Project Title: Dosimetry for New Energy System Pollutants

Start Date: --- End Date: Open

Funding Level: FY 80 $100K FY 81 $100K FY 82

Project Officer:	Principal Investigator:
Name: Dr. R. W. Wood	Name: Alan Hawthorne
Organization: Office of Health and Environmental Research	Organization: Oak Ridge National Lab. Health and Safety Res. Div.
Address: MS E-201 U.S. Department of Energy Washington, DC 20545	Address: Bldg. 4500S, S254 P.O. Box X Oak Ridge, TN 37830
Phone: /	Phone: 615 / 574-6346

Abstract: A field-portable deritive UV absorption spectrometer (DUVAS) suitable for measuring a variety of aromatic organic compounds as well as NH_3, NO_x, and SO_2 could be used for monitoring indoor air pollution. This microcomputer controlled instrument is capable of measuring ppb levels of several important pollutants in real time. Current work places primary emphasis on its use as an industrial hygiene monitor.

References to Completed Work: "DUVAS: A real-time aromatic vapor monitor for coal conversion facilities" American Industrial Hygiene Association J. (in press)

INV. NO. 27

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health and Environmental Research

Project Title: Transportable Mass Spectrometer for Monitoring Trace Quantities of Pollutant Gases

Start Date: ----

End Date: ----

Funding Level: FY 80 0 K FY 81 0 K FY 82
hardware on hand;
project not funded

Project Officer:

Name: ----

Organization:

Address:

Phone: /

Principal Investigator:

Name: Alan Hawthorne

Organization: Oak Ridge National Lab.
Office of Health and
Environmental Research

Address: Bldg. 4500S, S254
P.O. Box X
Oak Ridge, TN 37830

Phone: 615 / 574-6246

Abstract: A self-contained portable quadrapole mass spectrometer has been developed to make direct real-time measurements of room air. Although current detection limits of 0.1 - 1 ppm are insufficient for many indoor pollutants, the addition of a membrane enricher inlet system should lower the detection limit of many compounds to the ppb level. The computer controlled spectrometer is also capable of performing interference corrections to enhance the usefulness of the instrument.

References to Completed Work:

INV. NO. 28

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health and Environmental Research

Project Title: A paper filter technique for monitoring polynuclear aromatic hydrocarbon vapors

Start Date: 1981 **End Date:** 1983

Funding Level: FY 80 $100K FY 81 $150K Required FY 82

Project Officer:

Name: R. W. Wood

Organization: Office of Health and Environmental Research U.S. Dept. of Energy

Address: Mail Station E-201
U.S. Department of Energy
Washington, DC 20545

Phone: /

Principal Investigator:

Name: Tuan Vo-Dinh and R. B. Gammage

Organization: Oak Ridge National Lab. Health and Safety Res. Div.

Address: Building 4500S, MS. 258
P.O. Box X
Oak Ridge, TN 37830

Phone: /

Abstract: Vapors of polynuclear aromatic (PNA) compounds that are generated from incomplete combustion of organic materials are believed to be one of the main types of pollutants in indoor air due to cooking, cigarette smoking, etc. No rapid and simple technique exists for monitoring high boiling PNA vapors. This project will develop and evaluate a simple technique for direct analysis of PNA compounds in the vapor phase using a paper filter as sample collection medium and sample support for spectrometric detection based on room temperature phosphorescence.

References to Completed Work:

INV. NO. 29

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health and Environmental Research

Project Title: A colorimetric test method for nitrosamines

Start Date: 1981

End Date: 1983

Funding Level: FY 80 0 FY 81 0 FY 82

Project Officer:

Name: R. W. Wood

Organization: Office of Health and Environmental Research

Address: U.S. Dept. of Energy
Mail Station E-201
Washington, DC 20545

Phone: /

Principal Investigator:

Name: Tuan Vo-Dinh

Organization: Oak Ridge National Lab.
Health and Safety Res. Div

Address: Bldg. 4500S, MS 258
P.O. Box X
Oak Ridge, TN 37830

Phone: /

Abstract: The purpose of this project is to evaluate and develop a colorimetric test method for monitoring nitrosamines.

References to Completed Work:

INV. NO. 30

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Office of Health and Environmental Research

Project Title: Cost effective rapid analysis of PNA extracts by synchronous luminescence

Start Date: 1978 **End Date:** Open

Funding Level: FY 80 $50K FY 81 $70K FY 82

Project Officer:	**Principal Investigator:**
Name: R. W. Wood	**Name:** Tuan Vo-Dinh
Organization: Office of Health and Environmental Research	**Organization:** Oak Ridge National Lab.
Address: U.S. Dept. of Energy Mail Station E-201 Washington, DC 20545	**Address:** Bldg. 4500S P.O. Box X Oak Ridge, TN 37830
Phone: /	**Phone:** /

Abstract: Synchronous luminescence is an easy method of analyzing for select PNAs in solvent extracts of air particulate samples, and will greatly increase sample through-put. The PNAs are analyzed directly in solution by synchronous flourescence and/or spotted on filter paper and analyzed by room temperature phosphorescence.

References to Completed Work: T. Vo-Dinh, "Multicomponent-analysis by synchronous luminescence spectroscopy," Anal. Chem. 50, 396-401 (1978).

INV. NO. 31

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: DOE/Consumer Product Safety Commission

Project Title: Field-Portable Raman Spectrometer for the Monitoring of Hazardous Gases in Domestic Atmospheres

Start Date: January, 1980

End Date: ----

Funding Level: FY 80 $25K FY 81 Seeking additional funds FY 82 ________

Project Officer:

Name: J. F. Fandey

Organization: Consumer Product Safety Commission

Address:

Washington, DC

Phone: ____/________

Principal Investigator:

Name: Thomas G. Matthews and D. D. Schuresko

Organization: Oak Ridge National Lab.

Address: Health and Safety Researct Division

Oak Ridge, TN 37830

Phone: ____/________

Abstract: This project addresses the need for an inexpensive, sensitive and chemically selective real-time monitor for a variety of potentially hazardous gases found in domestic environments. The advent of simple, portable laser systems has made vibrational Raman scattering spectroscopy a viable chemical analysis technique for such purposes. The chemical selectivity and applicability of laser-based Raman spectroscopy to remote environmental analysis is well documented in the literature. Without resorting to tunable ultraviolet laser systems, however, detection limits for common pollutants have been restricted to a few ppm at short distances due to the inherently low collection efficiency of telescope detection systems for scattered radiation. We propose to develop vibrational Raman spectroscopy into a practical monitoring tool for the domestic environment by employing a simple nitrogen laser and a non-remote detection system using a computer optimized multipass optical cell.

References to Completed Work:

INV. NO. 32

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP - (Las Vegas)

Project Title: Las Vegas Indoor Radon Study

Start Date: July 1980 **End Date:**

Funding Level: **FY 80** **FY 81** **FY 82**

Project Officer:	**Principal Investigator:**
Name: Lee Ziegler, David Bernhardt, and Phil Nyberg	**Name:** In-house
Organization:	**Organization:** EPA/ORP/LVF
Address:	**Address:**
Phone: FTS / 595-2469	**Phone:** /

Abstract: Develop and field test radon, radon progeny, and building ventilation rate measurement techniques. The primary emphasis is on the verification of Track Etch monitoring techniques for environmental levels of radon and possibly radon progeny. The program is also evaluating the usefulness of short-term (minutes) sampling techniques for screening and characterizing the concentrations of radon and radon progeny in structures and developing a data base on radon concentrations and ventilation rates. Includes measurement of condensation mode.

References to Completed Work:

INV. NO. 33

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP-Western Environmental Radiation Facility (Las Vegas)

Project Title: Development, Validation, and Calibration of Radon/Radon Progeny Measurement Techniques

Start Date: Ongoing

End Date: Ongoing

Funding Level: FY 80 In-house

FY 81 In-house 3 person - yrs

FY 82

Project Officer:

Name: Phil Nyberg, Lee Ziegler and David Bernhardt

Organization: Office of Radiation Programs

Address: Las Vegas Facility

Las Vegas, NV 89109

Phone: FTS / 595-2469

Principal Investigator:

Name: In-house

Organization: EPA/ORP/LVF

Address:

Phone: /

Abstract: Evaluate, calibrate, and if necessary improve existing equipment and techniques for measuring both short-term grab samples (minutes) and long-term integral measurements (days to months) of radon and radon progeny concentrations. Keep informed of new developments and evaluate new instruments and techniques. This program includes techniques based on the collection of samples, instruments which make direct measurements, integrating instruments (such as the Radon Progeny Integrating Sampling Unit (RPISU), and Track Etch detectors.

References to Completed Work:

INV. NO. 34

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/Office of Radiation Programs

Project Title: Study of Field-Monitoring Techniques for Radon and Radon Daughter Isotopes

Start Date: Unknown

End Date: 2 years

Funding Level: **FY 80** - **FY 81** $287K **FY 82**

Project Officer:

Name: David E. Bernhardt

Organization:

Address: P.O. Box 18416
Las Vegas, NV 89114

Phone: FTS / 595-2469

Principal Investigator:

Name:

Organization:

Address:

Phone: /

Abstract: The contractor shall study in detail the performance of devices that measure the concentration of radon and radon decay products in air. The contractor shall determine what is measured by the device, the accuracy and precision of the measurements, and how the measurements relate to the actual radon and radon progeny concentration in the air. The contractor shall determine if and how these existing devices can be improved and shall recommend procedures for calibrating them.

References to Completed Work:

INV. NO. 35

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Identification and Assessment of Radon Sources in the Butte, Montana area

Start Date: May 8, 1980 **End Date:** May 8, 1982

Funding Level: FY 80 ____ FY 81 Approx. $140K FY 82 ____

Project Officer:

Name: Joseph M. Hans, Jr.

Organization: EPA/Office of Radiation Programs-Las Vegas Fac.

Address: P.O. Box 18416
Las Vegas, NV 89114

Phone: FTS / 595-2461
Commercial (702) 798-2461

Principal Investigator:

Name: Larry L. Lloyd

Organization: State of Montana

Address: Department of Health and
Environmental Sciences
Cogswell Building
Helena, MT 59601

Phone: FTS / 587-3671
Commerical (406) 449-3454

Abstract: The work will consist of four major tasks. One task will be to identify and determine the relative contribution of the principal radon sources in the Butte, Montana area and to determine if any common geological or geophysical relationship exists between the sources. Another task is to investigate the radon soil gas concentrations over the entire Butte, Montana metropolitan area to explore the uniformity of the general soil as a source term. The third task is to evaluate active and passive radon and radon progeny measurement devices for their usefulness to make surrogate measurements of the annual average radon concentrations and working levels in structures. The variability of radon concentrations and working levels (cause and effect) will be studied concurrently.

References to Completed Work:

INV. NO. 36

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/Office of Radiation Programs

Project Title: Provide Track Etch Radiation Detectors and Readout Service

Start Date: May 1980	End Date: October 1981
Funding Level: FY 80 $200K	FY 81 $200K FY 82

Project Officer:	Principal Investigator:
Name: Lee Ziegler	Name: James E. Gingrich
Organization:	Organization: Terradex Corporation
Address: P.O. Box 18416	Address: 460 North Wiget Lane
Las Vegas, NV 89114	Walnut Creek, CA 94596
Phone: FTS / 595-2469	Phone: 415 / 938-2545

Abstract: The Contractor shall provide Track Etch detectors and readout services for the integrated measurement of radon and/or radon daughter concentrations in support of field studies conducted by the Environmental Protection Agency, Office of Radiation Programs facilities at Las Vegas, Nevada, and Montgomery, Alabama. The detectors shall consist of the improved Track Etch plaques on badges or in the standard plastic cup holders (cup holders will be supplied with thoron membranes or radon progeny filters (used at EPA's option).

References to Completed Work:

INV. NO. 37

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA

Project Title: Demonstration of Remedial and Preventative Techniques for Controlling Indoor Radon/Working Levels in Structures on Florida Phosphate Lands

Start Date: **End Date:**

Funding Level: FY 80 FY 81 FY 82

Project Officer:

Name: Sam T. Windham

Organization: EPA/Eastern Environmental Radiation Fac.

Address: Montgomery, AL

Phone: 8 / 534-7617

Principal Investigator:

Name: Tony Stonehill

Organization: American Atcon

Address: 4195 Dundas Street, West
Toronto, Canada M8X 1Y4

Phone: 416 / 239-3011

Abstract: The effectiveness of radon control remedial measures for existing homes and design modifications for new homes will be investigated.

References to Completed Work:

INV. NO. 38

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/Office of Radiation Programs

Project Title: Effectiveness of Electronic Air Cleaners in Reducing Indoor Radon Daughter Concentrations

Start Date: April 1980 **End Date:** Indefinite

Funding Level: **FY 80** ____ **FY 81** ____ **FY 82** ____

Project Officer:	**Principal Investigator:**
Name: Sam T. Windham	**Name:** Sam T. Windham
Organization:	**Organization:** Eastern Environmental Radiation Facility
Address: Box 3009 Montgomery, AL 36193	**Address:** Box 3009 Montgomery, AL 36193
Phone: 205 / 272-3402	**Phone:** 205 / 272-3402

Abstract: Work is proceeding to determine the effectiveness of commercially available electronic air cleaners for reduction of radon daughter product levels in homes. EAC units have been installed on the central heating/cooling systems in three homes. Data have been collected and are being analyzed for unit effectiveness.

References to Completed Work:

INV. NO. 39

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Radon Transport in Buildings

Start Date: 7/80

End Date: 9/81

Funding Level FY 80 $50K FY 81 $200K FY 82

Project Officer:	Principal Investigator:
Name: Ronald Bruno	Name: Wayne Cassatt
Organization: Office of Radiation Programs ANR-460	Organization: National Bureau of Standards
Address: Washington, DC 20460	Address: Dept. of Commerce Washington, DC 20234
Phone: / 557-8927	Phone: / 921-2552

Abstract: Investigation of radon transport through and emanation from building materials.

References to Completed Work:

INV. NO. 40

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/Office of Radiation Programs

Project Title: The Dynamics of Airborne Radon Decay Products

Start Date: 1 July 1980

End Date: 30 June 1981 (Annual renewal anticipated)

Funding Level: FY 80 $30,476 FY 81 $127,856 FY 82

Project Officer:

Name: Dr. Ronald Bruno

Organization: EPA/Office of Radiation Programs

Address: Criteria and Standards Div.
(ANR-460)
Washington, DC 20460

Phone: FTS / 577-8927

Principal Investigator:

Name: Dr. E. A. Martell

Organization: National Center for Atmospheric Research*

Address: NCAR
P.O. Box 3000
Boulder, CO 80307

Phone: 303 / 494-5151, Ext. 682
FTS: 322-5682

Abstract: Environmental chamber studies, under controlled conditions and radon concentration levels, are conducted to assess the properties of radon progeny (attached fraction, size distribution, charge distribution, deposition velocities, etc.) and the influence of humidity, CN number distribution and size distribution, collection surface properties, aerosol aging, and other factors. The rates and mechanisms of deposition of attached radon progeny will be evaluated in natural environments as well as controlled laboratory conditions. Experimental methods include radon gas counting, low-level β^- counting, alpha spectroscopy, radiochemical analysis procedures, air filter and multistage impactor collection, CN counting, etc.

References to Completed Work: New project**. First paper "Radon Progeny on Biological Surfaces and Their Effects", is to be presented in the Special Symposium on Natural Radiation Environment, Bombay, January, 1981.

*National Center for Atmospheric Research is sponsored by the National Science Foundation.

**This NCAR Research Group has numerous past publications on ^{226}Ra, ^{222}Rn, long-lived radon progeny and other radioisotopes in the atmosphere and biosphere.

INV. NO. 41

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Effect of Indoor Air Circulation Systems on Radon Decay Product Concentration

Start Date: 10/80

End Date: 10/81

Funding Level: FY 80 ______ FY 81 $132K FY 82 ______

Project Officer:

Name: Ronald Bruno

Organization: EPA

Address: ORP, ANR-460
Washington, D.C. 20460

Phone: ____/ 577-8927

Principal Investigator:

Name: Dr. Melvin First

Organization: Harvard School of Public Health

Address: Department of Environmental Health Sciences
665 Huntington Avenue
Boston, MA 02115

Phone: 617 / 732-1164

Abstract: Investigating the effect of a variety of air circulation and treatment schemes on the concentration of radon decay products in a room. Development of remedial measures along this line.

References to Completed Work:

INV. NO. 42

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Age Specific Human Respiratory Cytometrics

Start Date:
End Date:

Funding Level: FY 80
FY 81 $100K
FY 82

Project Officer:	**Principal Investigator:**
Name: Neal S. Nelson	**Name:**
Organization: ORP, EPA	**Organization:** To be determined -
Address: Washington, D.C. 20460	**Address:** RFP advertised
Phone: 703 / 557-9380	**Phone:** /

Abstract: Study of histological specimens to develop a statistical estimate of the frequency and distribution of the cells of the epithelial lining of respiratory air ways and the variation with age.

References to Completed Work:

INV. NO. 43

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Excess Cancer in Mesa County, Colorado

Start Date: 19 Sept 1980

End Date: 19 Sept 1980

Funding Level: FY 80 FY 81 $53K FY 82

Project Officer:

Name: Neal S. Nelson

Organization: EPA

Address: ORP, ANR-460
Washington, D.C. 20460

Phone: 703 / 557-9380

Principal Investigator:

Name: Dr. Stanley W. Ferguson

Organization: Colorado Department of Health

Address: 4210 East 11th Avenue
Denver, CO

Phone: 303 / 320-8333, X-3100

Abstract: A descriptive epidemiologic study of multiple myeloma, leukemia, and cancer of the lung, pancreas, large intestine, and stomach for the period 1970-1979 in Mesa County comparing persons in residences with elevated radon and gamma background with others in Mesa County and in Colorado State other than Denver. Continuation of NRC remedial study "Excess Cancer Incidence in Mesa County Colorado," NUREG/CR-0635, July 1979.

References to Completed Work:

INV. NO. 44

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Age Specific Human Respiratory Morphometrics

Start Date: 20 Sept 1980

End Date:

Funding Level: FY 80 $48K FY 81 $100K FY 82

Project Officer:	**Principal Investigator:**
Name: Neal S. Nelson	Name: Dr. J. D. Mortensen
Organization: EPA	Organization: University of Utah Research Institute
Address: ORP, ANR-460 Washington, D.C. 20460	Address: 520 Wakara Way Salt Lake City, UT 84108
Phone: 703 / 557-9380	Phone: 801 / 581-6190

Abstract: Study is to provide data on respiratory airway length, diameter, and branching angle for Wiebel generations 0 to 7 in newborn, 5 year olds, 10 year olds and adults.

References to Completed Work:

INV. NO. 45

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Radon Community Cytology Study

Start Date: 25 July 1979 **End Date:**

Funding Level: **FY 80** $118K **FY 81** terminated **FY 82**

Project Officer:	**Principal Investigator:**
Name: Neal S. Nelson	**Name:** Dr. Stanley W. Ferguson
Organization: EPA	**Organization:** Colorado Department of Health
Address: ORP, ANR-460 Washington, D.C. 20460	**Address:** 4210 East 11th Avenue Denver, CO 80220
Phone: 703 / 557-9380	**Phone:** 303 / 320-8333 X-3100

Abstract: Study to determine if there is a significant difference in sputum cytopathology or in peripheral lymphocyte cytogenetics between persons living in areas of high radon concentrations as compared to persons living in areas of low environmental radon concentrations.

References to Completed Work:

INV. NO. 45

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Study of Health Effects of Radon in Water

Start Date: 30 Sept 1980
End Date:

Funding Level: FY 80 $118K
FY 81
FY 82

Project Officer:

Name: Carl Spector
Organization: EPA
Address: ORP, ANR-443
Washington, D.C. 20460
Phone: 703 / 557-9710

Principal Investigator:

Name: Dr. Herman Chernoff
Organization: Massachusetts Institute of Technology
Address: Room 2-381
Cambridge, MA 02139
Phone: 617 / 253-4992

Abstract: MIT will determine the feasibility of conducting an epidemiological study in New England of the health effects of radon in water. To this end, they will carry out small surveys to determine the magnitude and variability of radon levels and the difficulty of obtaining reasonable dose estimates for lung cancer patients. MIT will propose statistical designs for a large-scale study if one is warranted.

References to Completed Work:

INV. NO. 47

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP

Project Title: Measurement of Radon and Radon Decay Products in Butte, Montana

Start Date: January 1981

End Date: January 1983

Funding Level: FY 80 FY 81 $250K FY 82

Project Officer:	Principal Investigator:
Name: Joseph Hans	Name: Larry Lloyd
Organization: ORP	Organization: State of Montana
Address: P.O. Box 18416 Las Vegas, NV 89114	Address: Occupational Health Bureau Cogswell Bldg. Helena, MT
Phone: FTS / 595-2461	Phone: 406 / 449-3671

Abstract: This contract is concerned with measurement of radon decay products in homes in Butte, Montana. The purpose of the contract is the evaluation of various measurement methods and schemes with an emphasis on Track Etch detectors. Data will be used to evaluate correlations between short-term measurements and long-term averages and to determine the applicability of various short-term measurements as surrogates for annual averages. The data will also be used to evaluate seasonal variations and variations between locations in houses.

References to Completed Work:

INV. NO. 48

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEET

Project Title: Evaluation of Selected Remedial Techniques for Reducing Radon Decay Product Concentrations in Houses in Butte, Montana

Start Date: Expected April 1981 **End Date:** October 1982

Funding Level FY 80 ____ FY 81 $50K FY 82 ____

Project Officer:

Name: Robert Hartley

Organization: EPA

Address: IERL-Ci
Cincinnati, OH 45268

Phone: FTS / 684-4363

Principal Investigator:

Name: Larry Lloyd

Organization: State of Montana

Address: Occupational Health Bureau
Cogswell Bldg.
Helena, MT

Phone: 406 / 449-3671

Abstract: Because high levels of radon decay products have been measured in many houses in Butte, Montana, information is needed on the effectiveness of remedial techniques for reducing base levels. This contract is concerned with evaluation of reducing radon and radon decay product in houses in Butte, Montana.

References to Completed Work:

INV. NO. 49

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORP-
Western Environmental Radiation Facility (Las Vegas)

Project Title: Indoor Radon Studies in Support of States

Start Date: Ongoing
End Date:

Funding Level: FY 80 2 person-yrs FY 81 2 person-yrs FY 82

Project Officer:
Name: R. Douglas, D. Bernhardt, J. Hans
Organization: EPA
Address: Western Environmental Radiation Facility
Las Vegas, NV 89114
Phone: / 595-2459

Principal Investigator:
Name: R. Douglas, D. Bernhardt, J. Hans
Organization: EPA
Address: Western Environmental Radiation Facility
Las Vegas, NV 89114
Phone: / 595-2459

Abstract: The ORP/LVF supports states in assessing the source and concentrations of elevated levels of radon and radon progeny in structures. This program includes the use of aerial surveillance and a truck mounted gamma scanner to determine locations where uranium mill tailings, ore, or mine wastes or other materials with elevated levels of uranium or thorium chain radionuclides are present. Specific site work includes detailed gamma mapping of a location to denote where the elevated material is located and short-term and long-term radon and radon progeny measurements. The project includes some training and assistance in making measurements and loaning equipment based on available resources. The present projects include studies in Montana (Butte), South Dakota (Edgemont), New Mexico (Grants), and Utah.

References to Completed Work:

INV. NO. 50

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA

Project Title: Change of Air Radon levels due to Radon Removal from Potable Water

Start Date: September 31, 1980

End Date: September 31, 1981

Funding Level: **FY 80** ______ **FY 81** $35K **FY 82** ______

Project Officer:

Name:

Organization:

Address:

Phone: /

Principal Investigator:

Name: Dr. C. T. Hess

Organization: University of Maine

Address: Physics Department
Univ. of Maine at Orono
Orono, ME 04469

Phone: /

Abstract: Commercial and experimental spray aerators will be used to remove Radon-222 gas from potable water supplies. The removal of radon will be monitored in both water and household air using Wrenn meters and radon daughter detection equipment. This will permit the determination of the radon component due to water use. Air exchange parameter will also be determined by sulphur hexaflouride measurements.

References to Completed Work:

INV. NO. 51

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEPER

Project Title: Suitcase Portable Air Quality Measurement System with Selectable Modules

Start Date: FY 1981 **End Date:**

Funding Level: FY 80 **FY 81** **FY 82**

Project Officer:

Name: Dr. James Stemmle

Organization: EPA

Address: Energy and Air Division
401 M Street, SW
Washington, D.C.

Phone: /

Principal Investigator:

Name: Robert O. Woods

Organization: Sandia National Labs.

Address: Environmental Research
Division/4533
Albuquerque, NM 87185

Phone: /

Abstract: The objective of this project is to develop, test, and make widely available a portable system for making pollutant concentration measurements in aircraft, land vehicles, or at remote locations. The self-contained system will have service modules to supply instrument power and for data acquisition and recording, as well as sensor modules for an array of pollutants of interest. Sequential filter and grab-sampling modules will also be developed. Additional service modules for telemetry and remote command and control will be available. Although this system is being developed primarily for airborne and mobile application, it is well-suited to long term monitoring of indoor air quality in energy efficient buildings of interest. The system will be small enough to be operated while stowed in a closet. Only infrequent attendance will be required. If desired, the data being collected can be accessed in real time at some other location through the use of the telemetry module.

References to Completed Work:

INV. NO. 52

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA

Project Title: Personal Exposure Monitors

Start Date: FY 1979 **End Date:** FY 1982/3

Funding Level: FY 80 $335K FY 81 $150K (est.) FY 82

Project Officer:
Name: Dr. Lance Wallace, Dr. John B. Clements
Organization: EPA
Address: Wallace
EPA, Washington, D.C.
Clements
MD-78 EPA/EMSL
Research Triangle Park,
North Carolina
Phone: W-202 / 426-2175
C-FTS / 629-2454

Principal Investigator:
Name: Dr. W. L. Zielinski, Jr. (Air Program Manager)
Dr. W. H. Kirchhoff (Chief)
Organization: National Bureau of Standards
Address: Office of Environmental Measurements
National Bureau of Standards
Washington, D.C. 20234
Phone: 301 / 921-3775

Abstract: This program evaluates and develops principles, concepts and actual personal exposure devices for monitoring personal exposures to EPA-specified pollutants. Devices are evaluated, modified, or designed, and tested for accuracy, uncertainties, linearity, sensitivity, selectivity, and air movement effects; the later using an NBS-designed wind tunnel. Progress has included an evaluation of the Palmes diffusion tube and development of diffusion barrier samples for NO_2 having an estimated sensitivity thirty times the Palmes diffusion tube; completion of a survey report and identification of research needs for toxic organics; and the development of a personal active sampler for collection of two size fractions of air particulates, and an evaluation and intercomparison of the Harvard particulate sampler.

References to Completed Work:

INV. NO. 53

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OMTS

Project Title: Evaluation and Collaborative Testing of the Provisional Method for Measurement of Airborne Asbestos

Start Date: September, 1979 End Date: March, 1981

Funding Level: FY 80 $140K FY 81 $20K FY 82

Project Officer:		**Principal Investigator:**	
Name:	Michael E. Beard	Name:	George Yamate
Organization:	Environmental Monitoring Systems Laboratory	Organization:	ITT Research Institute
Address:	Methods Standardization Branch Quality Assurance Division Research Triangle Park, North Carolina 27711	Address:	10 West 35th Street Chicago, IL 60616
Phone:	919 / 541-2623 (FTS 629-2623)	Phone:	312 / 567-4295

Abstract: An evaluation of various measurement techniques for airborne asbestos described in EPA Report 600/2-78-038 resulted in the development of an optimized analysis protocol described in EPA Report 600/2-77-178 as the provisional method for measurement of airborne asbestos. Further investigation designed to evaluate and optimize several key operations described in the method is now in progress. The provisional method describes particulate collection of (or transfer to) polycarbonate film filters which are carbon coated, transferred to 3 mm microscope grids using the Jaffe Wick technique, and examined by transmission electron microscopy. Fibers with an aspect ratio of 3:1 (length to width) or greater are identified by morphology, and confirmed by selected area electron diffraction and energy dispersive x-ray fluorescence analysis. Mass is calculated based on volume of the fiber and density of the asbestos variety. Both fiber count and mass are reported for the sample. The current investigation will focus on determination of optimum face velocity for samplers, effect of transportation on sample, fiber collection efficiency, effect of ashing sample, the development of improved sampling technique using cellulose ester filters, and computer programmed x-ray fluorescence analysis of fibers. The method will be subjected to a multi-laboratory collaborative test to determine inter and intra laboratory precision and accuracy.

References to Completed Work:

INV. NO. 54

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OMTS

Project Title: Development of Asbestos Reference Materials

Start Date: July, 1979 End Date: July, 1981

Funding Level: FY 80 $400K FY 81 $250K FY 82

Project Officer:	Principal Investigator:
Name: Michael E. Beard	Name: J. Small
Organization: Environmental Monitoring Systems Laboratory	Organization: U.S. Dept. of Commerce
Address: Methods Standardization Branch Quality Assurance Division Research Triangle Park, North Carolina 27711	Address: National Bureau of Standards Washington, D.C. 20234
Phone: 919 / 541-2623 (FTS 692-2623)	Phone: 301 / 921-2875

Abstract: The National Bureau of Standards is engaged in a program to develop reference materials to support quality assurance activities for asbestos measurements made with the EPA provisional method (transmission electron microscopy). The reference materials will consist of (1) filters and (2) prepared microscope grids containing characterized samples of chrysotile and amphibole asbestos fibers incorporated in an urban air particulate matrix. These materials will allow the separation of errors due to sample preparation and sample counting. Critical factors related to the analysis of asbestos with the provisional method will be evaluated by NBS and coordinated with EPA Contract 68-02-3266 (IIT Research Institute) studies. A workshop on preparation of asbestos standards was held at NBS in October, 1979. Analysis addressed characterization of materials used for standard preparation, sample matrices, and criteria for counting and identifying asbestos fibers. A synopsis of the workshop will be published.

References to Completed Work:

INDOOR AIR RESEARCH INVENTORY

INV. NO. 55

Sponsoring Organization: EPA/OMTS

Project Title: Develop Method Write-up and Conduct Round-Robin Test for Measurement of Bulk Asbestos by Polarized Light Microscopy and X-Ray Diffraction.

Start Date: October, 1979 **End Date:** June, 1980

Funding Level: FY 80 $80K FY 81 FY 82

Project Officer:

Name: Michael E. Beard

Organization: Environmental Monitoring Systems Laboratory

Address: Methods Standardization Branch
Quality Assurance Division
Research Triangle Park,
North Carolina 27709

Phone: 919 / 541-2623 (FTS 629-2623)

Principal Investigator:

Name: D.E. Lentzen

Organization: Research Triangle Institute

Address:
Research Triangle Park,
North Carolina, 27709

Phone: 919 / 541-6745

Abstract: Protocols describing the analysis of bulk asbestos samples by polarized light microscopy (PLM) and x-ray diffraction have been developed from information presented by several investigators at a workshop held by EPA and the Bureau of Mines at Avondale, Maryland in October, 1979. The protocols have been subjected to a round-robin test to determine estimates of their precision and accuracy. The test showed the PLM protocol with a point count procedure produces data less biased and more precise than other PLM procedures currently used by the analysts. The XRD protocol produced data less biased and more precise than the PLM protocol. A model relating PLM areal estimates of asbestos concentration to mass estimates was developed and tested. Results of the investigation are being prepared for publication. The methods are to be used in surveys of schools for asbestos hazards by the Office of Pesticides and Toxic Substances.

References to Completed Work:

INV. NO. 56

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA, ORD/OMTS

Project Title: Love Canal Monitoring Study

Start Date: 8/1/80 **End Date:** 1/9/81

Funding Level: **FY 80** 0 **FY 81** $3M (approx) **FY 82**

Project Officer:	**Principal Investigator:**
Name: Tom Hauser	**Name:** Robert Bradway
Organization: Environmental Monitoring Systems Laboratory-RTP	**Organization:** GCA/Technology Division Prime Contractor*
Address: Research Triangle Park North Carolina 27730	**Address:** GCA/Technology Division Bedford, MA
Phone: 919 / 541-2106	**Phone:** 617 / 275-5444

Abstract: Samples collected on Tenax, polyurethane foam and hi-vol filters will be analyzed for 16 volatile organics, 10-12 pesticides, and 13 metals. About 66 homes will be sampled. Four homes outside Love Canal area (in Niagara Falls) will be sampled as background sites, 13 times over a two-month period.

*Performing Organization: Prime Contractor = GCA/Technology Division
Sampling Contractor = Geomet Technologies, Inc.

Analysis Subcontractors:

Southwest Research Institute
Gulf South Research Institute
Battelle Columbus Laboratories
PEDCo Environmental, Inc.

References to Completed Work:

INV. NO. 57

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEPER

Project Title: Portable Miniature Sampler for Potential Airborne Carcinogens in Microenvironments

Start Date: 9/77 **End Date:** 7/81

Funding Level: **FY 80** $125K **FY 81** $25K **FY 82**

Project Officer:

Name: James Mulik

Organization: Environmental Sciences Research Laboratory

Address: Atmospheric Chemistry and Physics Division
Research Triangle Park,
North Carolina 27711

Phone: 919 / 541-3067

Principal Investigator:

Name: Joseph J. Brooks

Organization: Monsanto Research Corp.

Address: Station B - Box 8
Dayton, OH 45407

Phone: 513 / 268-3411

Abstract: A three-sorbent portable sampling system has been developed for the broad range assessment of organics in ambient air. The system uses tubes containing Tenax-GC, Porapak R, and Ambersorb XE-340 in series with a portable pump operated at ~1 liter/minute. The system has been field tested in Los Angeles, Niagara Falls, Houston and Research Triangle Park. Analysis of the collected samples is accomplished by thermal desorption of the sample from the sorbent materials into a capillary GC/MS system.

References to Completed Work: [illegible] (January [illegible])

INV. NO. 58

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEPER

Project Title: Development of Passive Personal Monitors

Start Date: Sept. 1980 End Date:

Funding Level: FY 80 $77K FY 81 $100K FY 82

Project Officer:	Principal Investigator:
Name: James Mulik	Name: George Wooten
Organization: Environmental Sciences Research Laboratory	Organization: Monsanto Research Corp.
Address: Atmospheric Chemistry and Physics Division Research Triangle Park, North Carolina 27711	Address: Station B - Box 8 Dayton, OH 45407
Phone: 919 / 541-3067	Phone: 513 / 268-3411

Abstract: The objective of this program is to develop and evaluate a passive dosimeter based on diffusion principles and employing porous polymers as the sorbent element. This dosimeter is to provide for a multi-organic vapor capability and exhibit a sufficiently high collection rate to ensure monitoring at the ppb level. Toxic pollutants emanating from energy sources represent the compounds of interest to this study. Sampling is on a time-weighted average basis, whereby organics of interest are quantitatively collected on the sorbent bed, thermally desorbed, and concentration determined by standard chromatographic techniques.

References to Completed Work:

INV. NO. 59

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OMTS

Project Title: Carbon Monoxide Exposure Monitoring Pilot Field Study

Start Date: 4/1/80 **End Date:** 3/1/81

Funding Level: FY 80 ____ FY 81 $58K FY 82 ____

Project Officer:	**Principal Investigator:**
Name: Dr. David Mage	**Name:** Dr. Richard Ziskind
Organization: EPA	**Organization:** Science Applications Inc.
Address: MD-75 EMSL Research Triangle Park, North Carolina 27711	**Address:** 1801 Avenue of the Stars Suite 1205 Los Angeles, CA 90067
Phone: 919 / 541-2231	**Phone:** 213 / 553-2705

Abstract: The objectives of this work are: (1) to design and conduct a pilot field study utilizing personal samplers to develop Carbon Monoxide (CO) exposure data on subjects engaged in various routine daily activities in a large metropolitan area; (2) to develop a detailed design for a full scale monitoring program. The approach will be to select nine study subjects representative of major categories including: smoking habits, indoor/outdoor work, commuting distance and mode, and ambient CO concentration - residence and work. Other selection factors relate to: proximity of residence or work to fixed site monitors, automobile description, and home characteristics. Subjects will communicate personal sampler readings and relevant supporting information for each time interval of distinct activity and location during their day. Additionally a sampler will be operated in the residence. Supplemental measurements will be taken such as exhaled breath CO, and instantaneous readings during commuting and throughout residences. This pilot study will provide further insight into various topics such as: apportionment of daily exposure; equipment performance; and large scale utilization of personal samplers.

References to Completed Work:

INV. NO. 60

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Indoor/Outdoor Exposure Study

Start Date: December, 1977 **End Date:** April, 1978

Funding Level: **FY 80** 0 **FY 81** 0 **FY 82** ____

Project Officer:	**Principal Investigator:**
Name: David Hinton	**Name:** Ralph Sullivan
Organization: EPA	**Organization:** Xonics, Incorporated
Address: EMSL/RTP (MD-58) Research Triangle Park, North Carolina 27711	**Address:** Van Nuys, CA
Phone: 919 / 541-2454	**Phone:** ____/____

Abstract: The indoor and outdoor air of eight (8) homes in the Los Angeles area was monitored to provide a characterization of human exposures to air pollution. One week of data was obtained in each home.

References to Completed Work: Final Report, "Indoor/Outdoor Exposure Study" Contract No. [illegible], December, 1978.

INV. NO. 61

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OMTS and OEPER

Project Title: Total Exposure Assessment Methodology (Team) Study

Start Date: 10/79

End Date: 9/82

Funding Level: FY 80 $1.95M FY 81 $1.95M FY 82

Project Officer:

Name: Lance Wallace

Organization: EPA

Address: OMTS (RD-680)
Washington, D.C. 20460

Phone: 202 / 426-2175

Principal Investigator:

Name: Edo Pellizzari

Organization: Research Triangle Institute

Address: Research Triangle Park,
North Carolina 27711

Phone: /

Abstract: Study of exposure to 29 chemicals through air, drinking water, and food. About one-third to one-half the funding is for air/breath studies using personal monitors, mostly inside homes and workplaces.

References to Completed Work:

INV. NO. 62

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Pesticide Vapors in Treated Homes

Start Date: October 1980 **End Date:** September 1981

Funding Level: FY 80 ____ FY 81 ____ FY 82 ____

Project Officer:	**Principal Investigator:**
Name: Dr. Robert G. Lewis	**Name:** Ms. K. E. MacLeod
Organization: EPA	**Organization:** EPA
Address: HERL/Environmental Toxicology Division/Analytical Chemistry Branch (MD-69) Research Triangle Park, North Carolina 27711	**Address:** HERL/ETD/ECB (MD-69) Research Triangle Park, North Carolina 27711
Phone: 919 / 541-2510(FTS 8-629-2510)	**Phone:** 919 / 541-2942(FTS 8-629-2942)

Abstract: Many private homes are treated under contract with pesticides for control of insects. The air in a number of such homes in the RTP area is being sampled periodically and analyzed to determine typical residue levels and human exposure resulting from such treatment. Background levels of the organophosphorus, organochlorine, and carbamate pesticides being studied are being determined by parallel sampling of new and other control homes.

References to Completed Study:

INV. NO. 63

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Residential Air Survey

Start Date: August 1980 **End Date:** September 1981

Funding Level: FY 80 ____ FY 81 ____ FY 82 ____

Project Officer:	**Principal Investigator:**
Name: Dr. Robert G. Lewis	**Name:** Ms. K. E. MacLeod
Organization: EPA	**Organization:** EPA
Address: MERL/ETD/ECB (MD-69) Research Triangle Park, North Carolina 27711	**Address:** MERL/ETD/ECB (MD-69) Research Triangle Park, North Carolina 27711
Phone: 919 / 541-2510(FTS 8-629-2510)	**Phone:** 919 / 541-2942(FTS 8-629-2942

Abstract: Ten sampling locations have been selected throughout the United States. One home at each location has had a pesticide treatment history taken and is being sampled quarterly to determine the level of semi-volatile organic pollution. The locations have been divided into industrial/non-industrial and urban/suburban/rural categories. The results will give us a better understanding of which semi-volatiles are found in indoor air and what constitutes "normal" ranges of concentrations of these chemicals.

References to Completed Work:

INV. NO. 64

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Assessment of Human Respiratory Exposure Encountered by Residents of PCP-Treated Log Homes

Start Date: February 1981
End Date: September 1981

Funding Level: FY 80 ______ FY 81 ______ FY 82 ______

Project Officer:

Name: Dr. Robert G. Lewis
Organization: EPA
Address: HERL/ETD/ECB (MD-69)
Research Triangle Park,
North Carolina 7711
Phone: 919 / 541-2510(FTS 8-629-2510)

Principal Investigator:

Name: Dr. Douglas W. Bristol
Organization: EPA
Address: HERL/ETD/ECB (MD-69)
Research Triangle Park,
North Carolina 27711
Phone: 919 / 541-2135(FTS 8-629-2135)

Abstract: PCP levels present in the air of a home in the RTP area built with PCP treated logs and in the blood and urine of the residents will be determined. The variations of PCP vapor levels in different rooms and at different locations within a large room in the house will be measured. Both free and total (free plus conjugated) levels of PCP will be measured in the blood and urine samples. It is expected that total residue levels found in the different biological samples will correlate better than free levels.

References to Completed Work:

INV. NO. 65

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Evaluation of Personal Air Quality Monitors

Start Date: 6/80 **End Date:** 3/81

Funding Level: FY 80 $20K FY 81 $80K FY 82

Project Officer:	**Principal Investigator:**
Name: W. Crider	**Name:** James Flanagan
Organization: EPA	**Organization:** Rockwell International
Address: HERL Research Triangle Park, North Carolina 27711	**Address:** 5529 Chapel Hill Blvd. Durham, NC 27707
Phone: 919 / 967-9258	**Phone:** 919 / 493-2471

Abstract: Evaluation of personal air quality monitors to determine their suitability for use in Epidemiology study and for use in determining the homogeneity of pollutants in exposure laboratories. Monitors for inhaled particulates as well as CO, NO_2, O_3, and SO_2 will be tested in controlled environmental chambers under simulated field conditions.

References to Completed Work:

INV. NO. 66

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA

Project Title: Pollutants, Aero-Allergens and Respiratory Diseases

Start Date: 1 Aug 1977 **End Date:** 30 Sept 1981

Funding Level: FY 80 $69K FY 81 $74,700 FY 82

Project Officer:	**Principal Investigator:**
Name: Dr. Carl Hayes	**Name:** Michael D. Lebowitz, Ph.D.
Organization: EPA	**Organization:** Univ. of Arizona
Address: HERL Research Triangle Park, North Carolina 27711	**Address:** Professor of Internal Medicine Division of Respiratory Sciences Univ. of Arizona Health Sciences Center Tucson, AZ 85724
Phone: FTS / 629-2242	**Phone:** 602 / 626-6379

Abstract: The objective of this study is to evaluate the acute and chronic effects of acute indoor and outdoor exposures to air pollutants and aero-allergens, under various meteorological conditions, in asthmatic and non-asthmatic families. About 50 asthmatic families, 25 non-asthmatic families and 25 non-asthmatic non-allergic families were enrolled in 4 geographic clusters in Tucson, where the clusters are homogeneous with respect to vegetation and pollen and are 1/2 mile in diameter. The subjects fill out daily diaries and perform daily peak flows, 1/2 during spring and fall, 1/2 during winter and summer. Pollutants (TSP, RSP, O_3, CO, NO_2) are sampled indoors and outdoors in 2 random houses per week, as are pollen, temperature and humidity. At the center of each cluster, TSP and pollen are collected continuously and the other pollutants are collected on a sample basis.

References to Completed Work:
Lebowitz, M.D., et al. "Temporal Analysis of Acute Respiratory Symptoms, Aero-allergens and air pollutants" (Abs) [illegible] Proc., [illegible], 1977.
O'Rourke, M.K. "Pollen Dispersal and its Relationship to Respiratory Disease" etc.

INV. NO. 67

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Clinical Approach to Quantitating Formaldehyde Effects in Human Blood

Start Date: July 1980 **End Date:** July 1981

Funding Level: FY 80 ______ FY 81 $30K FY 82 ______

Project Officer:	**Principal Investigator:**
Name: Dr. George R. Simon	**Name:** V. F. Garry and A. Barksdale
Organization: EPA	**Organization:** Univ. of Minnesota
Address: Office of Research and Development Washington, D.C.	**Address:** Stone Laboratory I 421 29th Avenue SE Minneapolis, MN 55414
Phone: 202 / 426-2355	**Phone:** ___/______

Abstract: Because of a recent preliminary clinical investigation into reports of formaldehyde exposure in mobile homes and the lack of appropriate laboratory tests to identify human effects, we are proceeding to develop clinical laboratory detection methodology. We will attempt to correlate blood levels of formaldehyde with changes in human chromosomal material in cultured human lymphocytes.

References to Completed Work: Formaldehyde in the Home: Some Environmental Disease Perspectives. Minnesota Medicine Vol. 63, 107-111, February, 1980.

INV. NO. 68

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/ORD

Project Title: Report on Indoor Pollutants

Start Date: 9/10/79

End Date: 12/31/80

Funding Level: FY 80 $120K FY 81 $120K FY 82

Project Officer:

Name: Dr. Alan P. Carlin

Organization: EPA

Address: Office of Health and
Ecological Effects
401 M Street, SW
Washington, D.C. 20460

Phone: 202 / 755-0655

Principal Investigator:

Name: James A. Frazier, Sr. Staff Offic

Organization: National Research
Council

Address: Board on Toxicology and
Environmental Health Hazards
Assembly of Life Sciences
2101 Constitution Ave., NW
Washington, D.C. 20418

Phone: 202 / 389-6806

Abstract: This study will identify the sources of various pollutants in buildings, such as municipal buildings, transportation terminals, schools and individual residences. Special attention is to be given to the identification of the indoor sources and concentrations of the criteria pollutants: carbon monoxide, nitrogen oxides, ozone, sulfur oxides, and particles. Human exposure to asbestos (especially in schools) and to tobacco smoke should also be included and consideration should be given to looking at other hazardous or potentially hazardous pollutants commonly found indoors (e.g., ammonia, formaldehyde, radon, fugitive dust, and petroleum distillates used for dust control) and to evaluating the health effects of their interactions with the criteria pollutants.

References to Completed Work:

INV. NO. 69

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OHR

Project Title: Development of Methodology to Improve the Characterization of Human Exposure in CHAMP Monitoring Areas

Start Date: August 1977

End Date: December 1980

Funding Level: 1977-1980 $220,100

Project Officer:

Name: Dr. David T. Mage

Organization: EPA

Address: EMSL-RTP
MD-75
Research Triangle Park
North Carolina 27711

Phone: 919 / 541-2231

Principal Investigator:

Name: Stephen W. Connelly

Organization: TRC-Environmental Consultants, Inc.

Address: 125 Silas Deane Highway
Wethersfield, CT 06109

Phone: 203 / 563-1431

Abstract: A methodology to calculate exposure of individuals to air pollutants is described. The methodology calculates hourly peak and total 24-hour exposure of an individual based upon his mobility and activity. Model calculations show that a central fixed air quality station may not always represent the exposure of individuals residing in that neighborhood. Cooking with gas and commuting can lead to higher exposure to nitrogen dioxide and carbon monoxide. Staying indoors results in lower exposure to ozone and nitrogen dioxide with the absence of indoor sources.

References to Completed Work:

INV. NO. 70

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEET

Project Title: Indoor Air Quality Research Strategy

Start Date: June 1980 **End Date:** October 1980

Funding Level: FY 80 750 Hours FY 81 FY 82

Project Officer:	**Principal Investigator:**
Name: Ms. R. Cahill or Mr. D. Berg	**Name:** Dr. D. J. Moschandreas
Organization: EPA (RD-683)	**Organization:** GEOMET Technologies, Inc.
Address: 401 M Street, S.W. Washington, D.C. 20460	**Address:** 15 Firstfield Road Gaithersburg, MD 20760
Phone: 202 / 755-2737	**Phone:** 301 / 948-0755

Abstract: GTI assists EPA and other agencies participating in the Interagency Research Group on Indoor Air Quality in organizing, formulating, reviewing and distributing the final version of a national research strategy on Indoor Air Quality.

References to Completed Work:

INV. NO. 71

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/OEET

Project Title: 24-Hour Exposure and Related Topics

Start Date: October 1979 End Date: May 1980

Funding Level: FY 80 $50K FY 81 $150K FY 82

Project Officer:	Principal Investigator:
Name: Mr. W. Cain	Name: Dr. D. J. Moschandreas
Organization: EPA	Organization: GEOMET Technologies, Inc.
Address: Energy Systems Environmental Control Div. Cincinnati, OH 45268	Address: 15 Firstfield Road Gaithersburg, MD 20760
Phone: 513 / 684-4363	Phone: 301 / 948-0755

Abstract: The study is comprised of three phases: Phase I utilizes the GIOAP model to estimate the amount of pollutants infiltrating from outdoors. Phase II measures the in-transit portion of the exposure to air pollutants. Phase III reviews, assesses and models potential 24-hour exposures of various population subgroups.

References to Completed Work:

INV. NO. 72

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA

Project Title: Indoor Air Quality in Mobile Homes

Start Date: June 1, 1979 End Date: May 31, 1981

Funding Level: FY 8 $113,500 FY 81 $89,300 FY 82

Project Officer:	Principal Investigator:
Name: Carolyn Hesse	Name: Henry Anderson, M.D.
Organization: EPA	Organization: Wisconsin Division of Health
Address: Region 5 230 S. Dearborn Street Chicago, IL 60604	Address: P.O. Box 309 Madison, WI 53701
Phone: /	Phone: 608 / 266-1253

Abstract: This study is looking at the relationship between indoor concentrations of formaldehyde and other contaminants and the health status of the occupants of mobile homes. One hundred and forty mobile homes were randomly selected from city and township assessor lists. Since earlier studies on complaint homes by the Division of Health indicated that formaldehyde concentrations increased as the age of the home decreased, the majority of the homes chosen are new homes (constructed in 1979-1980). One-third of the homes are old homes (1973-1976) and serve as a low exposure group for comparison. Two samples are taken in each home once a month using the NIOSH method for formaldehyde collection and analysis with some modifications. At each visit environmental data is collected and occupants complete health questionnaires. Outdoor air samples are collected for formaldehyde analysis at each location. Clinical examinations will be conducted by physicians and will include pulmonary function testing.

References to Completed Work:

INV. NO. 73

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/NIOSH

Project Title: Control Technology Assessment and Exposure Profile for Health Hazards to Workers Participating in Formaldehyde Production

Start Date: October 1980	**End Date:** September 1982
Funding Level: FY 80	FY 81 $675K FY 82

Project Officer:	**Principal Investigator:**
Name: Robert P. Hartley	**Name:** Dr. William H. Hedley
Organization: U.S. EPA	**Organization:** Monsanto Research Corp.
Address: Industrial Environmental Research Laboratory	**Address:** 1515 Nicholas Road
Cincinnati, OH 45268	Dayton, OH
Phone: NIOSH-513 684-4321 EPA-513/ 684-4363	**Phone:** 513 / 268-3411

Abstract: This study will assess and document the control technology that is currently operating or in the planning stage to minimize or prevent exposure to health hazards associated with formaldehyde production. The study will additionally determine the 24-hour exposure pattern of the workers associated with formaldehyde production operations. The study will be conducted in appropriate plant locations, offices, buildings, residences and in-transit.

References to Completed Work:

INV. NO. 74

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA/NIOSH

Project Title: Control Technology Assessment and Exposure Profile for Workers Exposed to Hazards in the Electronic Components Industry

Start Date: 10/80 **End Date:** 6/82

Funding Level: FY 80 $1,150K FY 81 FY 82

Project Officer:

Name: Robert P. Hartley

Organization: USEPA

Address: Industrial Environmental Research Laboratory
Cincinnati, OH 45268

Phone: 513 / 684-4363

Principal Investigator:

Name: Dr. Ralph Mitchell

Organization: Battelle Columbus Lab.

Address: 505 King Avenue
Columbus, OH 43201

Phone: 614 / 976-7441

Abstract: This study will assess and document the control technology that is currently operating or in the planning stage to minimize or prevent exposure to health hazards associated with the electronic components manufacturing industry. The study will additionally determine the 24-hour exposure pattern of the workers associated with the same industry. The study will be conducted in appropriate plant locations, office buildings, residences, and in-transit.

References to Completed Work:

INV. NO. 75

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies

Project Title: Health and Environmental Effects of Oil and Gas Technologies: Research Needs

Start Date: May 1980 End Date: June 1981

Funding Level: FY 80 $60K FY 81 $60K FY 82

Project Officer:

Name: William Frietsch

Organization: EPA

Address: Energy Effects Division
Office of Research and Development
Washington, D.C. 20460

Phone: 202 / 426-3974

Principal Investigator:

Name: Dr. Richard D. Brown

Organization: The MITRE Corporation

Address: (W-53)
1820 Dolley Madison Blvd.
McLean, VA 22102

Phone: 703 / 827-6217

Abstract: A section of the subject report deals with research needs associated with combustion of oil and gas in the home. Topics covered include: radon emissions from the combustion of natural gas, and sulfur dioxide, nitrogen oxide, and carbon monoxide emissions from stoves, space heaters, and furnaces.

References to Completed Work:

INV. NO. 76

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPA-Office of Noise Abatement and Control

Project Title: Quite Energy-Efficient House

Start Date:	September 1980	**End Date:**	September 1982

Funding Level: FY 80 $175K FY 81 $175K FY 82

Project Officer:		**Principal Investigator:**	
Name:	Eugene Wyszpolski	**Name:**	David N. Keast
Organization:	EPA/ONAC	**Organization:**	Bolt Beranek and Newman Incorporated
Address:	Washington, D.C. 20460	**Address:**	50 Moulton Street Cambridge, MA 02238
Phone:	703 / 557-2126	**Phone:**	617 / 491-1850

Abstract: An abandoned duplex residence in Chelsea, MA will be renovated. One side will be conventional. The other will receive special attention for noise control and minimum energy consumption. Indoor and outdoor air quality will be studied, along with other parameters.

The purpose of the project is to show that building noise control and building energy conservation are synergistic.

References to Completed Work:

INV. NO. 77

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH and TSI Incorporated

Project Title: Development of a real-time aerodynamic particle sizer

Start Date: 1975 End Date: 1982

Funding Level: FY 80 FY 81 FY 82

Project Officer:

Name (1): NIOSH- Dr. Paul Baron
Name (2): TSI - Gilmore Sem
Organization: NIOSH/TSI Inc.

Address (1): NIOSH
Room B-113
5555 Ridge Avenue
Cincinnati, OH 45213
Address (2): TSI Incorporated
Box 43394
St. Paul, MN 55164

Phone: TSI 612/ 483-0900

Principal Investigator:

Name: Dr. Jugal Agarwal

Organization: TSI Incorporated

Address: Box 43394
St. Paul, MN 55164

Phone: 612 / 483-0900

Abstract: Current methods of measuring the aerodynamic size distribution of aerosol particles are limited to cascade impactors and cascade cyclones. Neither is well-suited to real-time in-situ measurements.

This program will result in a new commercial aerodynamic aerosol size distribution instrument useful for health effects, filter efficiency, and other research and monitoring programs. The instrument is based on measurement of velocity lag of airborne particles in an accelerating field by a laser velocimeter.

References to Completed Work: J.K. Agarwal and L.M. Fingerson, "Real-Time Aerodynamic Particle Size Measurement with a Laser Velocimeter," TSI Quarterly, V, February/March 1979.

INV. NO. 78

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Evaluation of Personal Exposure Systems

Start Date:	October 1980	End Date:	September 1982
Funding Level: FY 80	$400K	FY 81 $94K	FY 82

Project Officer:	Principal Investigator:
Name: M. L. Woebkenberg	Name:
Organization: NIOSH	Organization:
Address: DPSE Cincinnati, OH 45226	Address:
Phone: / 684-4266	Phone: /

Abstract: The development and evaluation of personal exposure monitoring systems involves an in-depth evaluation of systems for CO, HCN, and NO_2. The work will be multifaceted including laboratory and field evaluations of the Monitox system which is a unique industrial hygiene tool. The equipment allows for monitoring a worker's breathing zone, is equipped with an alarm function in the event the exposure exceeds the TLV, and through microprocessor electronics provides a streamlined process of data acquisition. Workers in mines and those exposed to diesel fumes in addition to those in the 73 job categories listed in NIOSH criteria documents will be affected. This work will be done in coordination with DSHEFS and BOM. It will mean increased worker participation, reduced analytical lag time and make compliance with OSHA recordkeeping requirements more accurate and efficient. One of the major advantages will be that generation of the complete exposure profile which will greatly aid HHE's epidemiological studies.

References to Completed Work:

INV. NO. 79

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Control Monitoring Equipment Assessment

Start Date: October 1979	End Date: September 1981
Funding Level: FY 80	FY 81 $8,100 FY 82
Project Officer:	**Principal Investigator:**
Name: J. Smith	Name:
Organization: NIOSH	Organization:
Address: DSPE Cincinnati, OH 45226	Address:
Phone: / 684-4266	Phone: /

Abstract: The purpose of this project is to assess the availability and state-of-the-art of monitoring devices suitable for use in engineering control and exhaust air recirculation systems. This contract will also evaluate existing in-plant control monitoring systems to determine their operating characteristics and identify research gaps as areas for further work. This research will benefit workers in all industries where hazardous exposures can occur by providing monitoring systems that can be used to warn workers of exposures and can be used together with control devices and work practices to lower workers overall exposure levels. The results of this assessment should encourage the increased use of control monitoring devices to evaluate and control worker exposures. EPA no longer supports this project.

References to Completed Work:

INV. NO. 80

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Continuous Optical Monitoring of Asbestos in Air

Start Date:

End Date:

Funding Level: FY 80 $25K FY 81 $22,970 FY 82

Project Officer:

Name: Paul Baron

Organization: NIOSH

Address: DPSE
Cincinnati, OH 45226

Phone: / 684-4266

Principal Investigator:

Name: Jan Stohurst

Organization: Pierce Foundation

Address: 290 Congress Avenue
New Haven, CT 06519

Phone: 203 / 562-9901

Abstract: Development of on-line asbestos monitor. Sample air is drawn through a sampler which has a rotating electric field, illuminated by a He-Ne laser. A photomultiplier delivers the optical signature of each particle to a microprocessor for sorting and counting of different categories of particles (size, length, width or diameter, straightness, etc.).

References to Completed Work:

INV. NO. 81

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Development Certification Criteria for Mine Dust Samplers

Start Date: October 1978

End Date: September 1982

Funding Level: Total: $185K FY 81 $103,720 FY 82

Project Officer:	Principal Investigator:
Name: J. Bowman	Name:
Organization: NIOSH	Organization:
Address: DPSE Cincinnati, OH 45226	Address:
Phone: / 684-4266	Phone: /

Abstract: The purpose of this project is to develop laboratory tests for the accuracy of dust samplers, and to use these tests to recommend better sampling and certification regulations. In FY-79 and FY-80, procedures were developed for measuring the bias and precision of the dust sampling units (10 mm cyclone, filter cassette and pump) under typical environmental conditions. The laboratory equipment and procedures were transmitted to the Air Sampling Instrumentation Section, and are the basis for our proposed revision of the sampler certification regulations (30 CFR 74).

To complete this project, further laboratory testing and statistical analysis must be conducted in order to develop a package of performance tests acceptable to MSHA and the scientific community. Further laboratory tests will be carried out to measure inaccuracies which arise under experimental conditions. An independent validation of the performance tests will be contracted to an outside aerosol laboratory.

This research will provide the scientific basis for a major reform of NIOSH's certification program for coal mine dust samplers. In addition, techniques for more accurate operation of the sampling units will be developed.

References to Completed Work:

INV. NO. 82

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Aerosol Monitoring Development

Start Date: October 1976

End Date: September 1981

unding Level: FY 80

FY 81 $196,910 FY 82

Project Officer:

Name: P. Baron

Organization: NIOSH

Address: DPSE
Cincinnati, OH 45226

Phone: / 684-4266

Principal Investigator:

Name:

Organization:

Address:

Phone: /

Abstract: Asbestos continues to be high priority item with OSHA and MSHA, especially with the NIOSH recommendation to lower the standard to 0.1 fiber/cc. A generation system for asbestos will be developed to provide improved samples for the PAT program. An image analysis system, procured in FY-80, will be evaluated in conjunction with the Inorganic Methods Development Section, as a reference instrument for counting asbestos fibers.

Under an Interagency Agreement with the USBM, NIOSH will develop a personal dust monitoring instrument. This instrument will fill a current need in the coal mine dust compliance program as well as in other areas.

An international symposium on dust measurement and regulations will be held under Interagency Agreement with the USBM.

A real time aerodynamic particle sizing facility will be set up with an instrument developed under contract in FY-80. This system will allow rapid and accurate evaluation of various dust samplers and preselection devices (e.g., 10mm cyclones).

A portable X-ray fluorescence analyzer completed in FY-80 under Interagency Agreement with DOE will be evaluated in the laboratory and in the field.

References to Completed Work:

INV. NO. 83

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: NAS Study of Monitoring Needs

Start Date:	October 1979	**End Date:**	September 1982
Funding Level: **Total:**	$200K	**FY 81** $159,950	**FY 82**

Project Officer:		**Principal Investigator:**	
Name:	L. Doemeny	**Name:**	
Organization:	NIOSH	**Organization:**	
Address:	DPSE Cincinnati, OH 45226	**Address:**	
Phone:	/ 684-4266	**Phone:**	/

Abstract: The Institute Director's office has requested a study of NIOSH's involvement in instrumentation development and monitoring. This project is a redirection of an FY-80 project to evaluate monitoring needs and instead answer the question on what should be NIOSH's place in the area of instrument research and how should it interact with the private enterprise system.

The project is jointly shared by the Office of Program Planning and Evaluation.

The study will examine the reasons why the government has been involved and review the programs of other agencies such as BOM, MSHA, EPA, DOE, etc.

This type of study will bring together some of this nations outstanding scientists in industrial hygiene, engineering, physics, chemistry and statistics with representatives of labor, management, instrument manufacturers and government agencies. The work of these scientists would be coordinated by the NAS.

The final recommendations will help the Institute in planning future instrument and development programs.

References to Completed Work:

INV. NO. 84

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Multiple Substance Monitoring - Spectroscopy

Start Date: October 1979 **End Date:** September 1984

Funding Level: **Total:** $700K **FY 81** $16,950 **FY 82**

Project Officer:	**Principal Investigator:**
Name: G. Breuer	**Name:**
Organization: NIOSH	**Organization:**
Address: DSPE Cincinnati, OH 45226	**Address:**
Phone: / 684-4266	**Phone:** /

Abstract: A field-usable, portable spectrometer will be developed as a survey instrument for industrial hygiene. The mass spectrometer is one of the most useful laboratory instruments because of its versatility and sensitivity. Development of a portable instrument will proceed by stages, beginning with a feasibility study (now in progress) and continuing through preliminary and final prototypes with appropriate laboratory and field testing.

References to Completed Work:

INV. NO. 85

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Multiple Substance Monitoring chromatography

Start Date: 1976

End Date: September 1982

Funding Level: **Total:** $600K

FY 81 $124,710 **FY 82**

Project Officer:

Name: L. Doemeny

Organization: NIOSH

Address: DPSE
Cincinnati, OH 45226

Phone: / 684-4266

Principal Investigator:

Name:

Organization:

Address:

Phone: /

Abstract: A portable, direct-reading multiple-substance instrument is the miniature gas chromatograph, conceived in a NIOSH feasibility study and developed over the last few years under NIOSH funding. The prototype devices delivered to NIOSH in 1980 will be tested and evaluated at NIOSH, and an RFC for further evaluation will be prepared as needed. A contract to extend the sensitivity of the GC's to the high ppb range was started in FY-80 and will continue into FY-82.

References to Completed Work:

INV. NO. 86

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Passive Monitor and Sensor Development

Start Date: October 1979 **End Date:** September 1981

Funding Level: FY 80 ______ FY 81 $69,600 FY 82 ______

Project Officer:

Name: M. L. Woebkenberg

Organization: NIOSH

Address: DPSE
Cincinnati, OH 45226

Phone: ___/ 684-4266

Principal Investigator:

Name:

Organization:

Address:

Phone: ___/

Abstract: The purpose of this project is to develop and evaluate methods of contaminant sampling and detection. Two contracts funded from this project in FY-80 are directly concerned with monitoring methods development. Contract 210-80-0075 involves developing methods to measure worker exposure to toxic substances while the worker is wearing a respirator. This work will directly impact on the health safety of all individuals who wear respirators on the job by monitoring their routine exposure in a formerly non-measured, confined space atmosphere. The second contract, NO. 210-80-0077, involves development of a method for NO_2 using a solvent loaded ultramicroporous resin. This technology may result in the obsolescence of impinger and bubbler techniques which would have a very positive effect on the success of monitoring programs particularly from the point of worker acceptance. In-house efforts will involve evaluations of sampling methods including the whole air sampler.

References to Completed Work:

INV. NO. 87

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Instrumentation Technology Transfer

Start Date:	October 1980	**End Date:**	September 1981
Funding Level: FY 80		**FY 81**	**FY 82**

Project Officer:		**Principal Investigator:**	
Name:	P. Baron	**Name:**	
Organization:	NIOSH	**Organization:**	
Address:	DPSE Cincinnati, OH 45226	**Address:**	
Phone:	/ 684-4266	**Phone:**	/

Abstract: The increased use of direct reading instrumentation in the NIOSH field studies and hazard evaluation groups is important in order to more effectively use limited personnel, to improve the quality of industrial hygiene samples analyzed and to reduce the number of samples by the analytical support laboratory. A series of tutorials will be held for the field personnel in order to assist the Division of Training and Manpower Development to train and inform them in the application of current instrument technology to industrial hygiene surveys.

References to Completed Work:

INV. NO. 88

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Characterization and Analysis of PNA's

Start Date:	October 1980	End Date:	September 1982
Funding Level: Total:	$158,340	FY 81 $135,570	FY 82

Project Officer:	Principal Investigator:
Name: J. Smith	Name:
Organization: NIOSH	Organization:
Address: DPSE 4676 Columbia Parkway Cincinnati OH 45226	Address:
Phone: FTS / 684-4266	Phone: /

Abstract: Present methods for assessing health hazards to workers exposed to PNA compounds depend on the analysis of one (or a very few) "representative" compounds or on determination of a gross parameter such as the benzene soluble fraction. These measurements and other possible indicators will be compared with state-of-the-art chromatographic, spectrographic and mass spectrometric analyses (using both prepared standards and actual samples from dieselized coal mines) in order to assess their validity and to rank the methods tested according to reproducibility, ease of application, and problems in use with field samples. Incorporated within this effort will be support for the DBBS-EPA diesel exhaust/coal dust animal exposure study. Measurements will also be made of the vapor pressures of several of these compounds to evaluate the evaporative loss of these hazardous substances from samples taken in the breathing zone of workers. This research will be of benefit to workers in a number of industries where exposure to PNA compounds can occur by providing an assessment of the methods used to determine their exposure. The present study will focus on methods to determine PNA exposure of workers exposed to a combination of diesel exhaust and coal dust in a coal mine environment, but it should have wider application in other industries.

References to Completed Work:

INV. NO. 89

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Monitoring and Sampling Strategies for Coal Mining Dust

Start Date: October 1980 **End Date:** September 1983

Funding Level: FY 80 ____ FY 81 $79,860 FY 82 ____

Project Officer:	**Principal Investigator:**
Name: J. Bowman	**Name:**
Organization: NIOSH	**Organization:**
Address: DPSE Cincinnati, OH 45226	**Address:**
Phone: / 684-4266	**Phone:** /

Abstract: The goal of this project is to develop and justify better sampling strategies from a scientific basis. To do this, three techniques will be examined: (1) time-series analysis and statistical decision theory applied to single-shift samples of coal mine dust; (2) the construction of a package of dust monitoring instruments for use in mine studies; and (3) a study of worker participation in hazard sampling.

References to Completed Work:

INV. NO. 90

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: New Behavioral Tests for Occupational Solvent Risks

Start Date: August 1, 1980 **End Date:** July 31, 1983

Funding Level: **FY 80** ____ **FY 81** ____ **FY 82** ____

Project Officer:	**Principal Investigator:**
Name:	**Name:** Dr. Hugh L. Evans
Organization:	**Organization:** New York University Medical Center
Address:	**Address:** Department of Environmental Medicine 550 First Avenue New York, NY 10016
Phone: /	**Phone:** 914 / 351-4249

Abstract: Our objective is to demonstrate the utility of new assays for neurotoxicity induced by organic solvents. Mice, pigeons and macaque monkeys will provide new animal models for human symptoms of appetite changes and sleep disturbances which result from sub-chronic inhalation of either toluene, trichloroethylene (TCE) or n-hexane. Some of the new assays are sufficiently streamlined to permit their use in routine toxicity screening. Other assays are more complex and time consuming. The proposed experiments will provide evidence on the general issue of whether these abbreviated methods differ significantly from their more complex counterparts in terms of their ability to demonstrate potential occupational health hazards. This evidence will be in the comparison of time-effect and dose-effect results from the streamline assays with results from more complex tests of learned behavior and sleep-activity cycles.

References to Completed Work:

INV. NO. 91

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Wisconsin Asbestos Hazard Management Program

Start Date: August, 1980	End Date: June, 1980
Funding Level: FY 80	FY 81 $79,726 FY 82
Project Officer:	Principal Investigator:
Name:	Name: Henry A. Anderson, M.D.
Organization:	Organization: Wisconsin Division of Health
Address:	Address: P.O. Box 309 Madison, WI 53701
Phone: /	Phone: 608 / 266-1253

Abstract: This project involves assessing asbestos hazards in schools and other public buildings. The State already has in existence a mechanism for inspecting buildings, collecting and analyzing samples and making recommendations to building owners. The existing program has no follow-up capabilities to monitor how well recommendations were followed and asbestos hazards corrected. Under this NIOSH funding, all data collected by the field inspectors is being computerized. This data will then be used to target inspection activities to ensure that all buildings are being inspected. The information will also be used to assess the degree to which recommendations are adhered to and hazards eliminated. Educational materials and programs are being developed for contractor groups and building officials to provide them with information on asbestos hazards and how to deal with them.

References to Completed Work:

INV. NO. 92

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIOSH

Project Title: Control Research Initiative

Start Date: October 1980 End Date: September 1983

Funding Level: Total: $480 K FY 81 $275,810 FY 82

Project Officer:	Principal Investigator:
Name: J. Smith	Name:
Organization: NIOSH	Organization:
Address: DPSE Cincinnati, OH 45226	Address:
Phone: / 684-4266	Phone: /

Abstract: The purpose of this project is to develop a research plan for the Control Research Section of the Monitoring and Control Research Branch. Special emphasis will be placed on the identification of monitoring systems that will alert workers of hazardous exposures and can be used to lower overall levels of worker exposure. A more limited amount of research may also be initiated in the development of promising control devices, process modification techniques, and work practices. Areas of research interest will be identified by reviewing control technology assessment final reports, a control monitoring equipment assessment report, and from personal contacts. Research gaps in the areas of control monitoring systems, control devices, process modification, and work practices will be identified as areas for future research. This project will benefit workers in all industries by providing research on control monitoring and control systems that can be used to warn workers of hazardous exposures and reduce overall exposure levels.

In addition to these long-range plans, we may become involved in looking into pesticide controls in grain handling facilities or at preventing fires and controlling firefighter exposures in the electronics industry.

References to Completed Work:

INV. NO. 93

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIEHS-OHHA

Project Title: Health Effects of Urea-Formaldehyde Compounds

Start Date: March 1980

End Date: October 1980

Funding Level: FY 80 Not Applicable FY 81 FY 82

Project Officer:

Name: Dr. Terri Damstra

Organization: NIEHS - OHHA

Address: P.O. Box 12233
Research Triangle Park,
North Carolina 27709

Phone: FTS / 629-3471

Principal Investigator:

Name: N/A

Organization: Toxicology Information Response Center, Oak Ridge National Laboratory

Address:

Phone: /

Abstract: Health Aspects of Urea-Formaldehyde Compounds contains bibliographic references to the published literature from 1963-1980. Each bibliographic listing contains a citation (in alphabetical order by author) and an abstract (where available). In addition, a permuted title index is provided as an aid in accessing this material.

The majority of the references in this bibliography pertain to urea-formaldehyde compounds used in home insulation and in the fabrication of construction materials.

References to Completed Work:

INV. NO. 94

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Division of Federal Employee Occupational Health/PHS

Project Title: Health Effects Associated with the Office Building Environment

Start Date: February, 1981
End Date: February, 1982

Funding Level: FY 80 N/A FY 81 N/A FY 82

Project Officer:	Principal Investigator:
Name: Victor Avitto	Name: Victor Avitto
Organization: DFEOH	Organization: DFEOH
Address: 6525 Belcrest Road W. Hyattsville, MD 20782	Address: 6525 Belcrest Road W. Hyattsville, MD 20782
Phone: 301 / 436-6631	Phone: 301 / 436-6631

Abstract: Recently there have been a number of office workers complaining about ill health due to their work environment. The complaints have ranged from headaches to respiratory diseases. The first objective of this study is to investigate each outbreak systematically so that the information obtained in each investigation is compatible with the others. The second objective is to compare the symptoms and characteristics of the environment to determine if there are common links among the outbreaks of symptoms.

References to Completed Work:

INV. NO. 95

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: NIEHS, EPRI

Project Title: Health Effects of Sulfur Oxides and Particulates

Start Date: 1 July 1974

End Date: 31 July 1983

Funding Level: FY 80 NIEHS $905,546
EPRI $247,462
FY 81 $944,100
FY 82

Project Officer:

Name #1 Edward Gardner
Name #2 Dr. James McCarrol
Organization 1 NIEHS
Organization 2 EPRI
Address #1 National Institute of
Environmental Health Sciences
Research Triangle Park, NC 27709
Address #2 EPRI
P.O. Box 10412
Palo Alto, CA 94303
Phone #1 919 / 755-4021
Phone #2 415 / 855-2000

Principal Investigator:

Name: Benjamin G. Ferris, Jr.
Organization: Harvard School of Public Health
Address: 665 Huntington Avenue
Boston, MA 02115
Phone: 617 / 732-1244

Abstract: The objective of this study is to evaluate the effects of low levels of SO_2 and respirable particulates on the health of human beings and to identify whether there is a degree of interaction between these pollutants at these levels. Sulfates and sulfites and nitrates and nitrites as well as ozone and nitrogen dioxide will also be monitored. Six communities have been selected that have different levels of SO_2 and respirable particulates, two high, two intermediate and two low. Random samples of the adult population (25-74) have been selected and studied by means of a standard respiratory questionnaire and simple tests of pulmonary function. Occupational and residential histories have been obtained as well as smoking habits. A cohort of children from each community has been selected and studied annually. Both of these population groups are being followed prospectively. Historical data on the levels of air pollution helped us to select the communities. We have continued monitoring in each area by means of central stations where continuous monitors are used and we have established 10 or more satellite stations in each community where we measure 24-hour samples for SO_2, NO_2, and mass respirable particulates (MRP) both indoors and outdoors.

References to Completed Work:

INV. NO. 96

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Urea-Formaldehyde Foam Insulation

Start Date: FY 1978	End Date: FY 1981 (?)
Funding Level: FY 80	FY 81 $200K 7 staff yrs. FY 82
Project Officer:	Principal Investigator:
Name: Harry I. Cohen	Name:
Organization: OPM	Organization: Same
Address: CPSC Washington, DC 20207	Address:
Phone: 301 / 492-6453	Phone: /

Abstract: CPSC has proposed a rule which will require manufacturers of UFFI to provide certain safety and performance information to consumers prior to purchase.

CPSC will consider other regulatory action, if any, in the first quarter of FY 1981.

References: Proposed Notice to Purchases: 6/10/80 Federal Register at page 39434. Briefing packages on UFFI are also available from CPSC's Office of the Secretary.

INV. NO. 97

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Particleboard, Plywood, Paneling.

Start Date: FY 1981

End Date: FY 1982 (?)

Funding Level: FY 80 ---   FY 81 $95K 6 staff yrs.   FY 82

Project Officer:	Principal Investigator:
Name: Harry I. Cohen	Name:
Organization: OPM	Organization:
Address: CPSC Washington, DC 20207	Address:
Phone: 301 / 492-6453	Phone: /

Abstract: CPSC has received consumer complaints regarding formaldehyde release from particleboard, plywood, and paneling. The Commission will determine the hazard posed by these products. Additionally, existing voluntary standards/ test methods will be reviewed and their adequacy determined. Samples of products will be tested using one selected test method. Industry will be encouraged to adopt formaldehyde levels for their products.

References to Completed Work:

INV. NO. 98

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Tishter Thermal Envelopes

Start Date: FY 1981 **End Date:** ?

Funding Level: FY 80 --- FY 81 $38K 3 staff yrs. FY 82

Project Officer:

Name: Harry I. Cohen

Organization: OPM

Address: CPSC
Washington, DC 20207

Phone: 301 / 492-6453

Principal Investigator:

Name: Same

Organization:

Address:

Phone: /

Abstract: Efforts will be in cooperation with EPA and DOE indoor air program. CPSC is interested in identifying consumer products involved in indoor air pollution and testing air-to-air heat exchangers.

References to Completed Work:

INV. NO. 100

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Carbon Monoxide

Start Date:

End Date:

Funding Level: FY 80 FY 81 $95K Staff - 2 yrs. FY 82

Project Officer:

Name: Rory S. Fausett

Organization: CPSC

Address: Health Sciences
Washington, DC 20207

Phone: 301 / 492-6984

Principal Investigator:

Name:

Organization:

Address:

Phone: /

Abstract: Combustion products from heaters and stoves (CO, CO_2, NO_2, SO_2, Formaldehyde, etc.) will be analyzed.

References to Completed Work:

INV. NO. 101

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Urea Formaldehyde Foam Insulation Study

Start Date: 12/79 **End Date:** 09/80

Funding Level: FY 80 $20K FY 81 Possible CPSC funding in 1981 FY 82

Project Officer:	**Principal Investigator:**
Name: J. F. Fandey	**Name:** Alan Hawthorne
Organization: Consumer Product Safety Commission	**Organization:** Oak Ridge National Lab.
Address: Washington, DC	**Address:** Oak Ridge, TN 37830
Phone: /	**Phone:** 615 / 574-6246

Abstract: A passive membrane dosimeter is being developed to measure low levels of formaldehyde in indoor environments. Laboratory evaluations indicate that the passive sampler is capable of measuring <100 ppb in an 8 hour sampling period with good reproducibility (40%). As currently implemented, the sampler is returned to the laboratory for analysis using an appropriate colorimetric technique. Studies are beginning to evaluate the sampler's performance under field conditions. Although designed for formaldehyde, with the use of an appropriate absorber the dosimeter could be used to measure other pollutants.

References to Completed Work:

INV. NO. 102

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: 13x Molecular Sieve as a Solid Adsorbent for Formaldehyde

Start Date: 1/80
End Date: ---

Funding Level: **FY 80** $80K **FY 81** --- **FY 82**

Project Officer:

Name: Joe Fandey
Organization: Consumer Product Safety Commission
Address: Washington, DC

Phone: /

Principal Investigator:

Name: Thomas G. Matthews
Organization: Oak Ridge National Lab.
Address: Health and Safety Research Division
Oak Ridge, TN 37830

Phone: /

Abstract: 13x Molecular sieve represents a potential solid adsorbent for formaldehyde for both passive and pumped air sampling devices. Experimental advantages over water as a collection medium include: long term storage capability of clean molecular sieve, stability of CH_2O exposed sieves and high collection efficiencies ($\sim$100%) achievable in pumped sampling devices.

References to Completed Work:

INV. NO. 103

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Modified CEA Instrument for the Monitoring of Formaldehyde in Domestic Environment

Start Date: 1/80 **End Date:**

Funding Level: FY 80 $80K FY 81 --- FY 82

Project Officer:		**Principal Investigator:**	
Name:	Joe Fandey	**Name:**	Thomas G. Matthews
Organization:	Consumer Product Safety Commission	**Organization:**	Oak Ridge National Lab.
Address:	Washington, DC	**Address:**	Health and Safety Research Div. Oak Ridge, TN 37830
Phone:	/	**Phone:**	/

Abstract: The CEA Instruments Inc., Model 555 analyze is a near-real-time monitor for Formaldehyde. With simple modifications in plumbing, reagent concentration and operational procedures, a 10-20 ppb detection limit for Formaldehyde can be achieved.

References to Completed Work:

INV. NO. 104

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Consumer Product Safety Commission

Project Title: Safety Devices--Gas Fired Appliances

Start Date: October 1979 **End Date:** May 1980

Funding Level: FY 80 $20K FY 81 FY 82

Project Officer:	**Principal Investigator:**
Name: Mr. Allan M. Thomas	**Name:** Donald E. Adams
Organization: U.S. Consumer Product Safety Commission	**Organization:** Calspan Corporation
Address: 5401 Westbard Avenue Washington, DC 20207	**Address:** P.O. Box 400 Buffalo, NY 14225
Phone: /	**Phone:** 716 / 631-6889

Abstract: This study investigated the feasibility of additional safety systems for home heating systems to reduce the carbon monoxide hazard resulting from spillage of combustion products. Primary emphasis was on methods that were available at relatively low cost or could be projected to be of low cost if implemented on a wide scale. Techniques were found to exist that would appear to meet tests of reasonableness in terms of probable effectiveness and cost. Thermal spill switches are the closest to commercial reality for large scale implementation on gravity-vented equipment. Barriers of cost might be broken readily in the future for systems with an electronics orientation. Also in the future, a reversible colorimetric technique appears to be worth a continued look.

References to Completed Work: "Safety Devices for Gas-Fired Appliances," by D. E. Adams and W. A. Bullerdiek, Calspan Report No. 6608-D-1, Contract No. CPSC-C-79-1007, May 1980.

INV. NO. 105

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Consumer Product Safety Commission

Project Title: Formaldehyde Outgassing From Insulation Products

Start Date: 9/10/80 **End Date:** Not Specified

Funding Level: FY 80 $50 FY 81 $85 FY 82

Project Officer:	**Principal Investigator:**
Name: J. A. Pickrell, D.V.M., Ph.D.	**Name:** J. A. Pickrell, D.V.M., Ph.D.
Organization: Lovelace Inhalation Toxicology Research Inst.	**Organization:** Lovelace Inhalation Toxicology Research Inst.
Address: P.O. Box 5890 Albuquerque, NM 87116	**Address:** P.O. Box 5890 Albuquerque, NM 87116
Phone: /	**Phone:** 505 / 844-7020

Abstract: This project is concerned with relating outgassing of formaldehyde to content of free and readily hydrolyzable formaldehyde present in products containing urea formaldehyde. A variety of chamber types will be used to assess outgassing under different conditions.

References to Completed Work:

INV. NO. 106

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Department of Housing and Urban Development

Project Title: Evaluation of Formaldehyde Problem in Residential Mobile Homes - Testing and Analysis

Start Date: 7/9/81   **End Date:** 10/9/81

Funding Level: FY 80 $50K   FY 81 $99K   FY 82

Project Officer:

Name: James McCollom
Organization: Department of Housing & Urban Development
Address: Room 8158
451 7th Street S.W.
Washington, DC
Phone: /

Principal Investigator:

Name: Jaswant Singh and Richard Walcott
Organization: Clayton Environmental Consultants, Inc.
Address: 25711 Southfield Road
Southfield, MI 48075
Phone: 313 / 424-8860

Abstract: Formaldehyde irritation is an increasing complaint of mobile home occupants. HUD sponsored this research to propose and validate a method for monitoring formaldehyde concentrations in mobile homes, to field test the monitoring method in a large number of occupied and newly constructed mobile homes, and to recommend approaches available to HUD for regulations to control formaldehyde concentrations. A pararosaniline analysis will be used and up to 250 mobile homes monitored.

References to Completed Work:

INV. NO. 107

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Department of Housing and Urban Development

Project Title: Evaluation of the Formaldehyde Problem in Residential Mobile Homes

Start Date: 28 September 1979 **End Date:** 31 March 1981

Funding Level: FY 80 $85,850 FY 81 FY 82

Project Officer:	**Principal Investigator:**
Name: James McCollom	**Name:** Robert F. Stone
Organization: U.S. Dept. of Housing and Urban Development	**Organization:** Technology and Economics, Inc.
Address: 451 Seventh Street, S.W. Washington, DC 20410	**Address:** 2225 Massachusetts Avenue Cambridge, MA 02140
Phone: 202 / 382-5611	**Phone:** 607 / 491-1500

Abstract: This study was an investigation of the incidence and severity of the formaldehyde problem in residential mobile homes, and of methods for amelioration of the problem. The study covered the following areas:

- o assessment of the magnitude of the problem;
- o development of model standards;
- o review of alternative technologies and enforcement techniques;
- o design and evaluation of at least five regulatory alternatives.

The research provided HUD with a prospectus of the formaldehyde problem from which to determine future research needs and the most appropriate regulatory strategy.

References to Completed Work: Final Task I Report under Contract No. HC-5105 - April 1980 (to be published by GPO)

INV. NO. 108

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: HUD (Prime Contractor - Technology and Economics, Inc.)

Project Title: An Evaluation of Formaldehyde Problems in Residential Mobile Homes

Start Date: May 1980
End Date: November 1980

Funding Level: FY 80 $33K FY 81 FY 82

Project Officer:

Name: Mr. Jim McCollom
Organization: Dept. of Housing and Urban Development
Address: 451 7th Street, SW
Room 8158
Washington, DC 20410
Phone: 202 / 755-0640

Principal Investigator:

Name: Dr. D. J. Moschandreas
Organization: GEOMET Technologies, Inc.
Address: 15 Firstfield Road
Gaithersburg, MD 20760
Phone: 301 / 948-0755

Abstract: A literature search is undertaken to review the current state-of-the-art of HCHO inside mobile homes. Physical and chemical properties, indoor sources and source strengths, observed HCHO concentrations, abatement technology, and an estimation of the formaldehyde problem in the mobile home were the specific topics reviewed in this document.

References to Completed Work:

INV. NO. 109

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Department of Housing and Urban Development

Project Title: Development and Demonstration of Radiation Hazard Mitigation Measures in Housing

Start Date: October 1980 **End Date:** October 1981

Funding Level: FY 80 FY 81 $75K FY 82

Project Officer:	**Principal Investigator:**
Name: Dr. Irwin H. Billick	**Name:** Larry Lloyd
Organization: U.S. Dept. of Housing and Urban Development	**Organization:** Dept. of Health and Environmental Sciences State of Montana
Address: Director, Environmental Hazards Research Division Washington, DC 20410	**Address:** Cogswell Building Helena, MT 59601
Phone: 202 / 755-7340	**Phone:** 406 / 449-3671 FTS 587-3671

Abstract: The purpose of this program is to develop, demonstrate and evaluate methods of mitigating radiation hazards in housing due to the entry of radon gas and its decay products. The program is intended to demonstrate methods for alleviating the problem in existing housing as well as methods used to prevent the problem from occurring in new housing. This phase of the program is for detailed planning of the project and for preliminary analysis of several methods that have been tried.

References to Completed Work:

INV. NO. 110

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Department of Housing and Urban Development

Project Title: Effects of Ionizing Radiation Standards on HUD Housing and Community Development Activities

Start Date: July 1980

End Date:

Funding Level: FY 80 ____ FY 81 $50K FY 82 ____

Project Officer:		Principal Investigator:	
Name:	George Winzer	Name:	Donald Hausknecht
Organization:	Department of Housing and Urban Development	Organization:	Science Applications, Inc.
Address:	451 Seventh Street, SW Room 8218 Washington, DC 20410	Address:	1801 Avenue of the Stars Suite 1205 Los Angeles, CA 90067
Phone:	/	Phone:	213 / 553-2705

Abstract: A number of federal, state and local governmental agencies have promulgated radiation standards and regulations to protect the public from ionizing radiation. However indoor radiation levels are not directly controlled and they have been observed to be high in several instances. The present study is considering the sources which contribute to the indoor radiation environment with the following objectives:

(1) To critically review the regulatory background.
(2) To assess the actual and potential effects of regulations on HUD programs.
(3) To suggest possible HUD regulatory strategies.
(4) To identify means for mitigating radiation exposure problems in existing housing and new construction.
(5) To suggest necessary further research.

References to Completed Work:

INV. NO. 111

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: USAF/OEHL

Project Title: Composite Fibers

Start Date: Jan 81 **End Date:** Jan 82

Funding Level: FY 80 FY 81 FY 82

Project Officer:		**Principal Investigator:**	
Name:	Captain Peter A. Lurker	**Name:**	
Organization:	USAF Occupational and Environmental Health Lab./ECH	**Organization:**	Same
Address:	Brooks AFB, TX	**Address:**	
Phone:	512 / 536-3214	**Phone:**	/

Abstract: Composite graphite manufacturers, Union Carbide and Celanese are currently contracting a toxicological evaluation with Hazelton Laboratory, United Kingdom. The test is with 5μ diameter fibers of 5-25μ length at a $20\mu\ g/m^3$ concentration. This size range and concentration was selected based on manufacturing plant industrial hygiene survey results. The USAF Occupational and Environmental Health Laboratory (USAF OEHL) is coordinating with Rome Air Development Center (RADC) and Air Force Aerospace Medical Research Laboratory (AFAMRL) to develop a toxicological exposure protocol for composite graphite fibers. An industrial hygiene evaluation is required of the machining (drill and sand) operations of these materials to determine the size distribution and concentration of the generated fibers and particulates.

References to Completed Work:

INV. NO. 112

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: USAF OEHL

Project Title: Chlordane in Military Family Housing Units

Start Date: Nov 79

End Date: Mar 83

Funding Level: FY 80 ______ FY 81 ______ FY 82 ______

Project Officer:

Name: Captain Thomas H. Lillie

Organization: USAF OEHL/ECE

Address: Brooks AFB, TX

Phone: 512 / 536-3667

Principal Investigator:

Name:

Organization: Same

Address:

Phone: /

Abstract: Air samples are and will be collected from USAF military family housing units and analyzed for chlordane. In 1979-1980 winter seasons, 500 housing units were tested at Scott AFB IL to determine if there was a significant chlordane exposure. Only 5% of the sampled houses exceeded $4\ \mu g/m^3$ and the maximum sample concentration was $294\ \mu g/m^3$. In the 1980-1981 season approximately 600 houses in the USA will be surveyed which were sub-slab injected with chlordane for termite control.

References to Completed Work:

INV. NO. 113

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Department of the Navy

Project Title: Modeling of Enclosed Air Space

Start Date: FY 82

End Date:

Funding Level: FY 80

FY 81

FY 82

Project Officer:

Name:

Organization:

Address:

Phone: /

Principal Investigator:

Name: Alfred H. Lowrey

Organization: U.S. Naval Research Lab.

Address: Code 6030
Washington, DC 20375

Phone: 202 / 767-3463

Abstract: The project involved modeling of complex enclosed air space for the purpose of examining the distribution of contaminants.

References to Completed Work:

INV. NO. 114

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Army Medical Research and Development Command
Fort Detrick, Frederick, MD 21701

Project Title: Military Ergonomics Division

Start Date: 1960 - continuing **End Date:**

Funding Level: FY 80 N/A FY 81 N/A FY 82

Project Officer:	**Principal Investigator:**
Name: Ralph F. Goldman, Ph.D.	**Name:** Ralph F. Goldman, Ph.D.
Organization: U.S. Army Research Inst. of Environmental Medicine	**Organization:** Same
Address: Natick, MA 01760	**Address:**
Phone: 617 / 653-1000, Ext. 2831	**Phone:** /

Abstract: Thermal characterization of indoor air effects requires attention to six factors: air temperature, motion, humidity and radiant temperature from the environment; the activity level of the occupant, which establishes his heat production; and the clothing worn which controls the loss of this heat production to the environment. Striking a balance between heat production and losses is essential to unimpaired performance, tolerance and survival, but may not be enough to achieve thermal comfort.

References to Completed Work:

INV. NO. 115

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: USDA, Forest Products Laboratory

Project Title: Development and Application of Solid Sample NMR Technique for the Study of UF Polymers

Start Date: 8/79 End Date: 9/81

Funding Level: FY 80 $26K FY 81 $27K FY 82

Project Officer:	Principal Investigator:
Name: George E. Myers	Name: Prof. Gary E. Maciel
Organization: Forest Products Lab.	Organization: Colorado State Univ.
Address: P.O. Box 5130 Madison, WI 53705	Address: Department of Chemistry Fort Collins, CO 80523
Phone: /	Phone: 303 / 491-6480

Abstract: Techniques are being developed to permit determination of the structure of UF polymers in the solid cured state. Such information will be correlated with stability in the cured state, method of cure, structure of the uncured polymer, method of synthesis.

References to Completed Work:

INV. NO. 116

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: USDA, Forest Products Laboratory

Project Title: Improve Performance of Urea-Resin Bonds

Start Date: 12/77
End Date: 1982

Funding Level: FY 80 --- FY 81 --- FY 82

Project Officer:

Name:

Organization:

Address:

Phone: /

Principal Investigator:

Name: George E. Myers

Organization: Forest Products Lab.

Address: P.O. Box 5130
Madison, WI 53705

Phone: 608 / 264-5852

Abstract: Hydrolytic stability of cured urea formaldehyde (UF) resins and durability of UF-bonded wood specimens are being examined as a function of resin structure, composition, and method of cure. Methods of determining resin structure are being investigated.

References to Completed Work: MYERS, G. E. Hydrolytic stability of cured UF resins. To be submitted to Wood Science. MYERS, G.E. Investigation of urea-formaldehyde polymer cure by infrared. Submitted to J. Appl. Polym. Sci.

INV. NO. 117

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: USDA, Forest Products Laboratory

Project Title: Formaldehyde Emission from UF-Bonded Wood Products

Start Date: 12/78 End Date: 1982

Funding Level: FY 80 FY 81 FY 82

Project Officer:	Principal Investigator:
Name:	Name: George E. Myers
Organization:	Organization: Forest Products Lab.
Address:	Address: P.O. Box 5130 Madison, WI 53705
Phone: /	Phone: 608 / 264-5852

Abstract: A variety of techniques have been evaluated for characterizing the formaldehyde emission behavior of plywood and particleboard. Emphasis has been placed upon the use of a dynamic (air ventilating) procedure which models actual use conditions. The effects of resin composition and board treatments are being investigated.

Completed work: MYERS, G. E., and M. NAGAOKA. Emission of formaldehyde by particle board: effect of ventilation rate and loading upon air contamination levels. To be submitted to For. Prod. J.
MYERS, G. E., and M. NAGAOKA. Formaldehyde emission: methods measurement and effects of particleboard variables. Submitted to For. Prod. J.
MYERS, G. E. Formaldehyde from UF-bonded panels--its measurement and its relation to air contamination. Presented at symposium "Wood Adhesives--Research, Application, and Needs," Sept. 23-25, 1980.

References to Completed Work:

INV. NO. 118

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Dept. of Interior, Office of Water Research & Technology

Project Title: "Natural Radionuclides in Maine Groundwaters" B-017-ME

Start Date: January 1979

End Date: December 31, 1980

Funding Level: FY 80 $15K federal + $15K non-federal FY 81 FY 82

Project Officer:

Name #1 Dr. Paul Uttormark
Name #2 Robert S. Madancy
Organization #1 University of Maine
Organization #2 U.S. Dept. of Interior
Address #1 Land & Water Resource Center
11 Coburn Hall
Orono, ME 04469
Address #2 Office of Water Res. & Tech.
Washington, DC 20240

Phone #1 207 / 581-7092
Phone #2 202 / 343-6481

Principal Investigator:

Name: C. T. Hess/S. A. Norton/
W. F. Brutsaert/D. Lowry
Organization: University of Maine
Address: Department of Physics
Orono, ME 04469

Phone: 207 / 581-7547

Abstract: The overall purpose of this project is to determine the levels and geographic distribution of natural radionuclides in Maine's groundwaters, and to assess the potential health hazard associated with the use of these waters for domestic supply. The specific objectives are 1) to find and delineate geological areas in Maine with high levels of ^{222}Radon/^{226}Radium in public and private water supplies; 2) to determine the effects on levels of radioactive constituents of (a) well depth, well yield, and type of pumping employed; (b) geological overburden type and thickness; and (c) age, origin, and chemistry of the groundwater; 3) to determine airborne pathways for ^{222}Radon-enriched water inside houses and other buildings; and 4) to investigate the possibility of using aeration systems to remove Radon from water inside a well prior to withdrawal.

References to Completed Work:

INV. NO. 119

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: U.S. Bureau of Mines

Project Title: Personal Dust Exposure Monitor

Start Date:	9/26/80	End Date:	3/26/82
Funding Level: FY 80	0	FY 81	$120K approx. FY 82

Project Officer:	**Principal Investigator:**
Name: Robert Timko	Name: Pedro Lilienfeld
Organization: U.S. Bureau of Mines	Organization: GCA/ Technology Division
Address: Bruceton, PA	Address: 213 Burlington Road Bedford, MA
Phone: 412 / 675-6646	Phone: 617 / 275-5444

Abstract: The objective of this program is the development and testing of a prototype personal dust exposure monitor (PDEM), capable of continuous sensing of the concentration of respirable dust in mining environments. The device must be designed for minimum physical interference with the wearer, while providing a representative measure of individual breathing zone exposure. The proposed PDEM will be based on light scattering sensing of the airborne particles, designed to emphasize the respirable fraction of the aerosol. The PDEM will incorporate a C-MOS microprocessor in order to perform all the required signal processing, averaging, data storage and timing functions.

References to Completed Work:

INV. NO. 120

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Nuclear Regulatory Commission

Project Title: Natural and Technologically Enhanced Sources of Radon-222

Start Date: ____ **End Date:** 7/80

Funding Level: FY 80 $50K FY 81 --- FY 82 ____

Project Officer:		Principal Investigator:	
Name:		Name:	C. C. Travis
Organization:		Organization:	ORNL/HASRD
Address:		Address:	ORNL 7509 Oak Ridge, TN 37830
Phone:	/	Phone:	615 / 576-2107 FTS 626-2107

Abstract: This study estimated radiation exposure and dose to residents of the United States, Canada, and Mexico resulting from ^{222}Rn released by uranium mills in the U.S. For comparative purposes, the report also contains estimates of ^{222}Rn released from other natural and technologically enhanced sources.

References to Completed Work:

INV. NO. 121

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: National Academy of Sciences/National Research Council

Project Title: Health Effects of Indoor Air Pollutants

Start Date:

End Date: Dec 1980

Funding Level: FY 80

FY 81

FY 82

Project Officer:

Name: James A. Frazier

Organization: Division of Medical Sciences

Address: NRC
Room 342
2101 Constitution Ave. NW
Washington, DC 20418

Phone: 202 / 389-6806

Principal Investigator:

Name: Jack D. Hackney, MD

Organization: Professional Staff Assoc.
Rancho Los Amigos Hosp.

Address: 51 Medical Science
Rancho Los Amigos Hospital
7601 Imperial Highway
Downey, CA 90242

Phone: 213 / 922-7461

Abstract: NRC is preparing, as one of a series of review monographs on air pollutants, a report on indoor pollution. Our mission is to prepare the section on known health effects of specific pollutants likely to be found indoors (whether of indoor or outdoor origin), specifically, those effects which have been determined in controlled laboratory studies of human volunteers.

References to Completed Work:

INV. NO. 122

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Federal Aviation Administration

Project Title: Effects of Ozone on Exercising and Sedentary Adult Men and Women Representative of the Flight Attendant Population

Start Date: January 11, 1978 End Date: October 1, 1979

Funding Level: FY 80 $108K FY 81 FY 82

Project Officer:	Principal Investigator:
Name: C. E. Melton, Jr.	Name: C. E. Melton, Jr.
Organization: Federal Aviation Adm.	Organization: Civil Aeromedical Instit. (CAMI) Aviation Phys. Lab., AAC-115
Address: CAMI, Aviation Physiology Laboratory, AAC-115 P.O. Box 25082 Oklahoma City, OK 73125	Address: Federal Aviation Administration P.O. Box 25082 Oklahoma City, OK 73125
Phone: /	Phone: /

Abstract: Three studies at two ozone concentrations have been carried out in an attempt to define the effect level for ozone under simulated flight conditions. Subjects were paid nonsmoking men and women in their third decade who had the anthropomorphic characteristics of airline flight attendants. All subjects were exposed to ozone in one experiment and to air only in another. Cardiopulmonary, performance, visual, and symptoms assessments were made. Hematologic and urinary studies were also made. Depending upon exposure and the amount of exercise the effects ranged from none to impairness of spirometry functions and effects on forced midexpiratory flow and photopic visual acuity.

References to Completed Work:

INV. NO. 123

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Federal Aviation Administration

Project Title: Effects of Ozone (0.30 Parts Per Million, 600 ug/m^3) on Sedentary Men Representative of Airline Passengers and Cockpit Crewmembers

Start Date: February 1, 1979 **End Date:** March 1980

Funding Level: FY 80 $98K FY 81 FY 82

Project Officer:	**Principal Investigator:**
Name: C. E. Melton, Jr.	**Name:** C. E. Melton, Jr.
Organization: Federal Aviation Adm.	**Organization:** Civil Aeromedical Instit. (CAMI), Aviation Physiology Lab., AAC-115
Address: CAMI Aviation Physiology Laboratory, AAC-115 P.O. Box 25082 Oklahoma City, OK 73125	**Address:** Federal Aviation Administration P.O. Box 25082 Oklahoma City, OK 73125
Phone: /	**Phone:** / 749-4861

Abstract: This study was undertaken to determine the effects of 0.30 ppmv ozone on 40 men representative of airline pilots. All were medically fit; 20 were smokers and 20 were nonsmokers. Subjects were divided into two age groups, 40-49 years and 50-59 years. The experiments consisted of exposure to 0.30 ppmv ozone and to air only for 3 h at a simulated altitude of 6,000 ft mean sea level. Subjects were sedentary throughout the experiment. Ozone had effect on heart rate and short-term memory. The group showed symptoms related to ozone exposure; most were shown by the 40- to 49-year-old nonsmoking group while at altitude and postaltitude, and in smokers in the 50- to 59-year age group only at altitude. Eye irritation was the commonest symptom, followed by headache, nasal irritation, and throat irritation. Data showed significant effects of ozone on forced expiratory volume. Dark adaptation threshold was elevated in ozone in the 50- to 59-year nonsmoking age group. Retinal bleach recovery time was retarded and blink rate was higher during ozone exposure. It is concluded that 0.30 ppmv ozone is near threshold for adverse effects of ozone.

References to Completed Work: FAA-AM-80-9

INV. NO. 124

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: National Science Foundation

Project Title: Particle Analysis by Mass Spectrometry (PAMS)

Start Date: August 1979
End Date: December 1983

Funding Level: FY 80 $125K FY 81 $125K FY 82

Project Officer:

Name: Dr. Morris Ojalvo
Organization: National Science Foundation
Address: Program Director
Particulate and Mulitphase Processes

Phone: /

Principal Investigator:

Name #1 S. K. Friedlander
Name #2 M. P. Sinha/C. E. Giffin
Organization 1 UCLA/Caltech JPL
Organization 2 Caltech Jet Propulsion
Address 1 Dept. of Chemical Engineering
UCLA
Los Angeles, CA
Address 2 Caltech Jet Propulsion Lab.
Pasadena, CA
Phone #2 213 / 354-6358/2494

Abstract: Techniques of particle beam generation and focal plane mass spectrometery are being studied to measure the chemical composition of single aerosol particles on a continuous, realtime basis. The particle size range of interest is $0.1\ \mu m < d_p < 5\ \mu m$ where d_p = particle diameter. Different methods of volatilization and ionization, including laser ionization, are being studied at present. An understanding of the efficiency of introduction of particles into the source region and the efficiency of ionization as a function of particle size and composition will be stressed. The ions are detected by electro-optical ion detection, a technique recently developed at the Caltech Jet Propulsion Lab. A mass range of 25 - 500 amu can be simultaneously monitored by this detector with single ion sensitivity, thus providing a detection capability at the femotgram (10^{-15} g) level. The simultaneity of detection is crucial because of the short duration of ion generation from a single particle. Parallel experiments are being conducted at UCLA on characterization of the particle beam and on the generation of beams composed of biological particles.

References to Completed Work:

INV. NO. 125

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Solar Energy Research Institute

Project Title: Model Solar Audit and Auditor Training Manual for Residential Conservation Service Program

Start Date: August 15, 1979
End Date: December 31, 1980

Funding Level: FY 80 ______ FY 81 ______ FY 82 ______

Project Officer:

Name: William Hoagland
Organization: Solar Energy Research Institute
Address: Golden, CO
Phone: 303 / 231-1048

Principal Investigator:

Name: Dr. Michael B. Rogozen
Organization: Science Applications, Inc.
Address: 1801 Avenue of the Stars
Suite 1205
Los Angeles, CA 90067
Phone: 213 / 553-2705

Abstract: The purpose of this research was to develop a more realistic model of the buildup of radon daughters in apartments using granite rockbed systems to store solar heat. Radon source strength estimates were based upon experimental data in the literature. The rockbed was assumed to charge from 9 a.m. to 6 p.m. and discharge from 6 p.m. to 9 a.m. Several different infiltration rates were assumed for night and daytime. A 4th-order Runge-Kutta technique was used to compute minute-by-minute hourly values of the working level for apartments having nightime infiltration rates of 0.5 and 0.2 air changes/hr, respectively, the maximum calculated exposures were 0.0053 and 0.0105 wl. The lower the nighttime infiltration rate, the later this peak is reached. Actual radon daughter exposures are likely to be smaller, since (1) a relatively high source strength was used in the model and (2) Daughter Particle dropout was not modeled.

References to Completed Work: Rogozen, M.D., 1980 Dynamic Simulation of radon exposure in apartment using solar rockbed heat storage, Technical Note 922-41-08, SAI-1-068-81-545

INV. NO. 126

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Solar Energy Research Institute

Project Title: Health Effects of Indoor Air Quality: Survey & Analysis

Start Date: June 1980 **End Date:** August 1980

Funding Level: **FY 80** $5,000 **FY 81** **FY 82**

Project Officer:

Name: Dr. Carl L. Strojan
Organization: SERI
Address: 1617 Cole Boulevard
Golden, CO 80401
Phone: 303 / 231-1094
FTS / 327-1094

Principal Investigator:

Name: Dr. Linda Scott
Organization: St. Olaf's College
Address: Northfield, MN 55057
Phone: 507 / 663-3102

Abstract: Identification of indoor air quality problems has attracted increasing attention during the past few years due to new interest in alternative energy production and conservation systems. These systems, however, have a potential impact on indoor air quality. Even though ambient pollutant infiltration is actually reduced, indoor generated pollutants from combustion, human activities, and building materials may reach significant levels in the indoor environment to produce adverse health effects. This report deals with the classes of pollutants, their source, the significance of reported levels, behavior of the pollutant in the indoor environment, possible health effects, and control strategies. Research needs are delineated with emphasis on: identification of the decay rates and behavior of pollutants indoors, standardized data collection on pollutant levels and source strengths, analysis of exposure levels to populations, analysis of health risk from acute and chronic exposure levels, and determination of effectiveness of control measures.

References to Completed Work:

INV. NO. 127

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Interagency Regulatory Liaison Group

Project Title: Integrated Risk Assessment of Formaldehyde

Start Date: 9/80 **End Date:** 5/81

Funding Level: FY 80 $80K FY 81 $65K FY 82

Project Officer:	**Principal Investigator:**
Name: Richard Dailey	**Name:**
Organization: U.S. Environmental Protection Agency	**Organization:** Same
Address: (TS-792) 401 M Street, SW Washington, DC 20460	**Address:**
Phone: FTS / 426-2535	**Phone:** /

Abstract: Comprehensive preliminary risk assessment responsive to needs of the five IRLG agencies. Will include exposure assessment, health and environmental effects assessment, and qualitative and quantitative risk assessment.

References to Completed Work:

INV. NO. 128

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: National Institute of Building Sciences, NIBS, NEA, NSF & AIA

Project Title: Workshop on Building Information

Start Date: September 17, 1980
End Date: March 30, 1981

Funding Level: FY 80 0
FY 81 $20K
FY 82

Project Officer:

Name: David A. Harris, AIA
Organization: National Institute of Building Sciences
Address: 1015 15th Street, NW
Washington, DC 20005
Phone: / 347-5710

Principal Investigator:

Name: D. Michael Murtha, Ph.D.
Organization: Association for the Study of Man-Environment Relations
Address: P.O. Box 901
McLean, VA 22101
Phone: 703 / 536-6297

Abstract: A workshop in improving access to scientific and technical information related to the design of the built environment is being conducted by the Association for the Study of Man-Environment Relations.

The major function of the workshop is to bring together representatives of information producers (researchers), significant information users (designers), and information linkers (information services), from both the public and private sectors, so that they can discuss and resolve their mutual needs, roles and responsibilities, with respect to possible improvements in the transfer of relevant research information from producers to users.

Through a series of pre-planned and structured work sessions, the participants will develop a coherent plan or plans, of action for improving access to information. This plan will be submitted to responsible decision-makers, in appropriate agencies and organizations, for the purpose of securing their support and participation in implementing the proposed improvement.

References to Completed Work:

INV. NO. 129

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: ASHRAE (American Society of Heating, Refrigerating & Air-Conditioning Engineers, Inc.)

Project Title: RP-238 Tobacco Smoke Odor Control - Development of a Test Method

Start Date: 7-1-80 **End Date:** 6-30-81

Funding Level: FY 80 $36,757 FY 81 FY 82

Project Officer:	**Principal Investigator:**
Name: Same as Investigator	**Name:** Mr. Frank Jarke
Organization:	**Organization:** IITRI
Address:	**Address:** 10 West 35th Street Chicago, IL 60616
Phone: /	**Phone:** /

Abstract: Follow up of RP-111. The purpose is to develop a reliable method to test filtering media for effectiveness in removing tobacco smoke odor. Relationship of tobacco stimulant (Formulation No. 9) and real tobacco will be established, the limitations of Formulation No. 9 as a filter testing material and its limitations in representing real tobacco smoke will be determined and measured.

References to Completed Work:

INV. NO. 130

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: ASHRAE

Project Title: Development of Test Method for Gaseous Contamination Removal Devices

Start Date: November 1980 **End Date:** October 1981

Funding Level: FY 80 FY 81 $73K FY 82

Project Officer:

Name: Mr. J. Richard Wright,

Organization: ASHRAE

Address: Director of Technology
United Engineering Center
345 East 47th Street
New York, NY 10017

Phone: 212 / 644-7853

Principal Investigator:

Name: Dr. Amnon Birenzvige

Organization: TRC - Environmental Consultants, Inc.

Address: 125 Silas Deane Highway
Wethersfield, CT

Phone: 203 / 563-1431

Abstract: TRC will be conducting a program for ASHRAE to develop a test methodology that will enable the manufacturers of control equipment and HVAC engineers to evaluate the ability of control equipment to control the concentration of gaseous compounds or odors under varying operating conditions. Emphasis will be placed on testing control equipment with respect to the effectiveness of controlling the odor of tobacco smoke.

Research is being conducted in three phases. In Phase I a test apparatus will be designed and constructed which will be capable of accommodating filters which are used in commercial installations. In Phase II the methodology of testing the filter in the test duct will be developed. The various methods of introducing the contaminants into the chamber will be tested including the feasibility of using synthetic tobacco odor in lieu of actual tobacco odor. The procedures for conducting an accelerated test will also be tested in this phase. In Phase III the correlation between the test duct results and the actual field characteristics of the filter will be tested at the John B. Pierce Foundation in New Haven, Connecticut.

References to Completed Work:

INV. NO. 131

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: ASHRAE

Project Title: Hospitals: Recommended Minimum Exhaust Air Rates For Energy Conservation

Start Date: ____________ **End Date:** ____________

Funding Level: Proposed $41K (approx.)

Project Officer:	**Principal Investigator:**
Name: undetermined	**Name:** undetermined
Organization:	**Organization:**
Address:	**Address:**
Phone: ___/______	**Phone:** ___/______

Abstract: To investigate existing design criteria and assemble exhaust air change rates for hospital areas such as (1) patient toilet rooms, (2) autopsy, (3) X-ray fluoroscopic and treatment rooms and other relatively clean spaces now being exhausted. Further, to determine the minimum exhaust rates in consideration for energy conservation, system dilution, odors and provisions for a healthful environment. To evaluate potential for off-occupancy reduction of exhaust air in the same above mentioned spaces, and to establish criteria and design guidelines for exhaust air change rates in the hospital rooms and spaces under study.

NOTE: This is a proposed research project which has been approved by the Research & Technical Committee contingent upon available funds.

References to Completed Work:

INV. NO. 132

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.)

Project Title: RP-202 Ventilation Requirements in Operating Rooms

Start Date: March, 1977 **End Date:** February, 1980

Funding Level: FY 80 $45,534 FY 81 $24,894 FY 82 ______

Project Officer:	**Principal Investigator:**
Name: Same as Investigator	**Name:** Dr. James E. Woods
Organization: ______	**Organization:** Iowa State University
Address: ______	**Address:** Dept. of Mech. Eng. Ames, IA 50010
Phone: ____/______	**Phone:** ____/______

Abstract: Research project on the control of airborne contamination in operating rooms causing post-operative infection. One significant aspect of this project will be the establishment of acceptable criteria with which air quality in operating rooms can be evaluated. Phase 1 developed analytical model of operating room. Extended one year to make biophysical model. Completion was expected in late 1979.

References to Completed Work:

INV. NO. 133

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: ASTM

Project Title: ASTM Standard Specifications for Foam Insulation

Start Date: ____ End Date: ____

Funding Level: FY 80 ____ FY 81 ____ FY 82 ____

Project Officer:	Principal Investigator:
Name:	Name: Walter J. Rossiter, Jr.
Organization:	Organization: National Bureau of Standards
Address:	Address: Bldg. 266, Room B348 Washington, D.C. 20234
Phone: /	Phone: 301 / 921-3109

Abstract: As chairman of the ASTM task group for urea formaldehyde foam insulations, a task is being conducted to coordinate task group activities for the development of an ASTM standard specification for these foam insulations. The 7th draft has been prepared and is being balloted at ASTM C16 Main Committee. The draft contains two requirements related to the release of formaldehyde from these insulations: (1) Free Aldehydes in the Resin, and (2) Free Aldehydes in the Foam.

References to Completed Work: 7th draft of ASTM Standard for UF Foams

INV. NO. 134

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Gas Research Institute

Project Title: Environmental Control of Gas Appliances

Start Date: Ongoing

End Date:

Funding Level: FY 80 $100K FY 81 $50K FY 82 $100K

Project Officer:

Name: Donald O. Johnson, Manager

Organization: Gas Research Institute

Address: Environmental Research
10 West 35th Street
Chicago, IL 60616

Phone: 312 / 567-6690

Principal Investigator:

Name: Frank Belles, D.W. DeWerth

Organization: American Gas Association Laboratories

Address: 8501 East Pleasant Valley Rd.
Cleveland, OH 44131

Phone: 216 / 524-4990

Abstract: As part of the ongoing GRI/AGAL project, the 1980-81 effort will consist of three tasks:

1) To reduce emissions of existing furnace and water heater designs presently in production by relatively simple and inexpensive means;
2) To identify and develop simple effective procedures to test for leaking furnace heat exchangers; and
3) To evaluate and characterize NO_x emissions from high efficiency burner systems, including power, infrared, catalytic, and pulse combustion burners, and to develop guidelines for emission reductions.

References to Completed Work:

INV. NO. 135

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Gas Research Institute

Project Title: Analysis of the Health Effects of Cooking Gas Based on the Harvard Six-City Study

Start Date: October 1980 **End Date:** July 1981

Fund'ng Level: **FY 80** $56,740 **FY 81** **FY 82**

Project Officer:

Name: Donald O. Johnson

Organization: Gas Research Institute

Address: Manager
Environmental Research
10 West 35th Street
Chicago, IL 60616

Phone: 312 / 567-6690

Principal Investigator:

Name: H. Daniel Roth

Organization: Roth Associates, Inc.

Address: 6115 Executive Blvd.
Rockville, MD 20852

Phone: 301 / 770-4405

Abstract: The purpose of this project is to critically examine the design, data collection techniques, statistical procedures and findings of the Harvard Six-City Study in order to determine if any aspects of the study might benefit from GRI participation. GRI is seeking a detailed scientific assessment of the validity of the Harvard Study since the findings of that study may affect the direction and scope of GRI's Efficient Utilization program.

References to Completed Work:

INV. NO. 136

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Gas Research Institute

Project Title: Performance Modeling of Advanced Gas Burner Systems

Start Date: January 15, 1980 **End Date:** January 15, 1981

Funding Level: FY 80 $300K FY 81 not known FY 82

Project Officer:	**Principal Investigator:**
Name: Robert Hemphill	**Name:** P.T. Harsha/R. Edelman
Organization: Gas Research Institute	**Organization:** Science Applications, Inc.
Address: 10 West 35th Street Chicago, IL 60616	**Address:** Combustion Dynamics and Advanced Technology Dept. 21133 Victory Blvd., Suite 216 Canoga Park, CA 91303
Phone: 312 / 567-6731	**Phone:** 213 / 348-8520

Abstract: The purpose of this project is to undertake a comprehensive assessment of existing fuel interchangeability prediction techniques and their effectiveness relative to predicting gas burner performance. A model is being developed which will predict emissions from residential, commercial, and industrial burner systems. Validation of the model will be through controlled laboratory and field condition experiments. Environmental control strategies relevant to emissions of NO_x, CO, hydrocarbons and soot will be developed.

References to Completed Work: 1979 Annual report available from GRI

INV. NO. 137

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Gas Research Institute

Project Title: Development and Field Verification of a Model of House Air Infiltration for single-Family Dwellings

Start Date: January 1979 End Date: June 1981

Funding Level: FY 80 $98K FY 81 $81K FY 82

Project Officer:

Name: Mr. L. Wright
Organization: Gas Research Institute
Address: 10 West 35th Street
Chicago, IL 60616
Phone: 312 / 567-6662

Principal Investigator:

Name: R. A. Macriss
Organization: Institute of Gas Technology
Address: 3424 S. State Street
Chicago, IL 60616
Phone: 312 / 567-3888

Abstract: IGT has now available a practical and operational air infiltration model for detached and two family residential dwellings equipped with fossil-fuel central furnaces and boilers. The model has been preliminarily verified for accuracy through simulation of infiltration of several homes of other investigators. The present phase of the program is designed to extend the applicability of the model to a wide spectrum of homes by the inclusion of the effect on air infiltration of schedules for vent-fan usage, door and window openings, wind shielding patterns, existence of fireplace chimney, etc.

References to Completed Work:

INV. NO. 138

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Gas Research Institute

Project Title: Potential Health Effects of Residential Energy Conservation Measures

Start Date: February 25, 1980 End Date: May 24, 1981

Funding Level: FY 80 $75K FY 81 not known FY 82

Project Officer:	**Principal Investigator:**
Name: Donald O. Johnson, Manager	Name: G. Stewart Young
Organization: Gas Research Institute	Organization: Arthur D. Little, Inc.
Address: Environmental Research 10 West 35th Street Chicago, IL 60616	Address: Acorn Park Cambridge, MA 02140
Phone: 312 / 567-6690	Phone: 617 / 864-5770

Abstract: The purpose of this project is to assess the potential impacts of energy conservation measures such as reducing air infiltration and ventilation on indoor air quality and human health, through a detailed examination of the existing literature. Task I - Air Quality Literature Review will: 1) identify types, sources, and levels of pollutants in the residential environment; 2) review existing health effects studies; 3) prepare annotated bibliographies for 1 and 2; 4) examine existing pollutant standards, especially data used in their formation. Task II - Air Infiltration Literature Review will: 1) examine existing air infiltration literature; 2) examine trends in infiltration control and regulation; and 3) discuss impacts of reductions in air infiltration rates on residential air quality. The final report will include a proposed R&D program for GRI in indoor air quality.

References to Completed Work: Draft final report due February 24, 1981

INV. NO. 139

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: EPRI

Project Title: Comparison of Indoor/Outdoor Concentrations of Atmospheric Pollutants

Start Date: April 1978 **End Date:** December 1980

Funding Level: FY 80 ______ FY 81 ______ FY 82 ______

Project Officer:	**Principal Investigator:**
Name: Dr. R. Perhac	**Name:** Dr. D. J. Moschandreas
Organization: Electric Power Research Institute	**Organization:** GEOMET Technologies, Inc.
Address: 3412 Hillview Avenue Palo Alto, CA 94303	**Address:** 15 Firstfield Road Gaithersburg, MD 20760
Phone: 415 / 855-2572	**Phone:** 301 / 948-0755

Abstract: Data are presented from a 24-month comprehensive study of the air quality indoor non-industrial environments. The research program includes a nine month field study in the Boston metropolitan area designed to monitor and compare the indoor and outdoor air quality at ten residences and two office buildings using a mobile monitoring unit. Residences and offices were monitored for periods of two and three weeks, respectively, under real-life conditions, in three indoor locations and at one adjacent outdoor site. Statistical summaries based on hourly concentrations were made for ten gaseous pollutants. Component analyses of particulate matter were performed using 24-hour integrated samples. Residences were classified as having indoor sources (gas facilities) or lacking indoor sources (electric facilities).

References to Completed Work:

INV. NO. 140

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Human Ecology Research Foundation of the Southwest

Project Title: Comprehensive Air Pollution Measurements in an Environmental Unit

Start Date: 30 September, 1978
End Date: 30 September 1981

Funding Level: FY 80 $6K FY 81 $6K FY 82

Project Officer:

Name: Dr. Willian Rea
Organization:
Address: 8345 Walnut Hill Lane
Suite 240
Dallas, TX 75231
Phone: 214 / 368-4132

Principal Investigator:

Name: Robert Edgar
Organization: Univ. of Texas at Dallas
Address: Dept. of Env. Science
Box 688
Richardson, TX 75080
Phone: 214 / 690-2965

Abstract: Various inorganic, organic, and particulate pollutants were measured at the Environmental Unit in Brookhaven Medical Center, Dallas, Texas. Both inside and outside measurements were recorded to determine the source of pollution. Weekly and daily measurements were performed to detect seasonal and daily variations in pollution concentrations.

References to Completed Work: "Comprehensive Air Pollution Measurements in an Environmental Unit." preprint, Annals of Allergy.

INV. NO. 141

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Mobil Foundation

Project Title: Assessing the Performance of Activated Carbon in the Indoor Environment

Start Date: January, 1980

End Date: Open

Funding Level: FY 80 $10K FY 81 FY 82

Project Officer:

Name: None

Organization:

Address:

Phone: /

Principal Investigator:

Name: Amos Turk

Organization: The City College of the City University of New York

Address: Department of Chemistry
New York NY 10031

Phone: 212 / 690-8306

Abstract: As an activated carbon adsorber approaches saturation, its adsorption efficiencty decreases. However, the odor quality of the post-carbon air is influenced by various factors such as chemical interactions among adsorbates, and therefore cannot be predicted from the degree of saturation of the carbon or from its adsorption efficiency. Assessing the service life and performance of an activated carbon system therefore requires the monitoring of carbon saturation and post-carbon air quality over time.

This paper describes a portable activated carbon air sampler containing 16 adsorbers in parallel, designed to monitor an indoor environment for up to one year. Carbon saturation is measured by weight gain with correction for moisture uptake. Analyses of adsorbed water by distillation, coulometry, thermogravimetry, and Karl Fischer titration are critically compared. Convenient methods of sensory evaluation of the post-carbon air from the sample adsorbers are described.

References to Completed Work: For presentation at ATCA meeting, Philadelphia, June 1981.

INV. NO. 142

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: American Health Foundation

Project Title: Tobacco Smoke and Indoor Pollution

Start Date: January 1, 1978 **End Date:**

Funding Level: **FY 80** None **FY 81** None **FY 82**

Project Officer:

Name:

Organization:

Address:

Phone: /

Principal Investigator:

Name: D. Hoffmann, Ph.D.

Organization: American Health Found.

Address: Dana Road
Valhalla, NY 10595

Phone: /

Abstract: Chemical-analytical studies, combined with bioassays, have led to the identification of toxic, mutagenic and carcinogenic agents in tobacco smoke. In general, the amounts of individual components in sidestream smoke (SS) which is released between puffs, are comparable to their amounts in the mainstream smoke (MS). However, some components are generated in sidestream smoke in disproportionately greater amounts, often constituting significant levels of environmental pollutants. Such compounds include ammonia (SS/MS=100-170), aromatic amines (20-50), 3-vinylpyridine (20-30), formaldehyde (40-60), nitrogen oxides (∿5), and carcinogenic volatile N-nitrosamines (20-60). Analyses of tobacco smoke polluted indoor atmospheres reflect this occurrence. Current studies are concerned with assays of other toxic and carcinogenic smoke constituents in polluted indoor environments.

References to Completed Work: Prev. Med. 4; 66, 1975; Cancer Res. 37: 3218, 1977; 39: 2505, 1979. Proc. 4th Conf. "Sensing of Environmental Pollutants" 816, 1980; IARC Sci. Publ. 19: 343, 1978; J. Anal. Toxical. 3: 150, 1979; 4: 255, 1980.

INV. NO. 143

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Chicago Lung Association

Project Title: Characterization of Ozone Levels in Inside Environments

Start Date: ____________ **End Date:** ____________

Funding Level: **FY 80** ________ **FY 81** ________ **FY 82** ________

Project Officer:	**Principal Investigator:**
Name: John Kirkwood	**Name:** R.A. Wadden & R.J. Allen
Organization: Chicago Lung Association	**Organization:** University of Illinois
Address: Executive Director 1440 W. Washington Street Chicago, IL 60607	**Address:** School of Public Health P.O. Box 6998 Chicago, IL 60680
Phone: ____/__________	**Phone:** ____/__________

Abstract: Ozone emission factors were developed for domestic electrostatic air cleaners and photocopying machines. The air cleaners had emission rates from 0-546 μg/min. These rates will ordinarily not produce air concentrations which are > 60 $\mu g/m^3$ (0.030 ppm) above background. The emission rate for photocopying machines varied from 48-158 μg/copy. In small, poorly ventilated rooms these emission rates were sufficient to produce incremental steady state ozone concentrations up to 396 $\mu g/m^3$ (0.202 ppm). Recent copying machine maintenance was found to reduce ozone production to less than the detectable level, 4 $\mu g/m^3$ (0.002 ppm).

References to Completed Work: R.J. Allen, R.A. Wadden and E.D. Ross, Characterization of Potential Indoor Sources of Ozone, Am. Ind. Hyg. Assoc. J. 39(466-471), 1978.

INV. NO. 144

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Self and Society for Clinical Ecology

Project Title: Organoleptic methods for detection of out-gassing and environmental control

Start Date: January 1958 End Date: Ongoing

Funding Level: FY 80 $1K FY 81 $1K FY 82

Project Officer:	Principal Investigator:
Name: Francis Silver, P.E.	Name: Francis Silver, P.E.
Organization: Francis Silver and Associates	Organization: Francis Silver and Associates
Address: Berkeley County Court House Martinsburg, WV 25401	Address: Berkeley County Court House Martinsburg, WV 25401
Phone: 304 / 267-7687	Phone: 304 / 267-7687

Abstract: Organoleptic methods or the "gas sense" has long provided the principal protection for humans exposed to single or multiple toxic gases, known or unknown. Such methods have been used extensively in chemical warfare (especially in World War I), in gas engineering, in mining engineering, in submarining, in fumigating, and in tank and tanker cleaning. Although such an approach does have weaknesses, its strengths are such that it has long been a firm, practical rule that an equal weight must be given to information from the senses as from instruments, chemical assay, or sensitive animals. All too often the canary is still sitting on its perch, unruffled, and safety lamps indicate no hazard, yet miners are being overcome. In January of 1958, the principal investigator realized that this dictum was being ignored and investigators were instrument-bound. He then took on the task of upgrading the scientific basis for organoleptic methods.

References to Completed Work: Clinical Ecology, edited by L. D. Dickey, Chas. Thomas, Publisher, 1976, Chapter 45, titled "Senses vs Laboratory in Environmental Control," pp. 411-421. A later paper titled, "Tactile Sensation in Environmental Control," was presented in 1976.

INV. NO. 145

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: National Cancer Institute

Project Title: Mineral Fiber Size Carcinogenicity-In Vitro

Start Date: 1978 **End Date:** 1981

Funding Level: FY 80 $25K FY 81 $25K FY 82

Project Officer:	**Principal Investigator:**
Name:	**Name:** Arthur L. Frank, M.D., Ph.D.
Organization:	**Organization:** Mount Sinai School of Medicine
Address:	**Address:** 1 Gustave L. Levy Place New York, NY 10029
Phone: /	**Phone:** 212 / 650-6422

Abstract: Crushed serpentine rock, quarried at Rockville, Maryland, has been used in large quantities for road and playground surfacing. The rock consists essentially of the fibrous serpentine mineral chrysotile (asbestos) and platy serpentines. In vitro bioassay in $P338D_1$, a malignant mouse macrophage-like cell line, show that chrysotile is cytotoxic while the platy serpentines are not.

References to Completed Work:

INV. NO. 146

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Ball State University and Indiana Academy of Science

Project Title: Survey of Indoor Formaldehyde Levels and Associated Health Effects in Delaware County, Indiana

Start Date: July 31, 1980 **End Date:** July 31, 1981

Funding Level: FY 80 ____ FY 81 $1K FY 82 ____

Project Officer:	**Principal Investigator:**
Name: Thad Godish, Ph.D.	**Name:** Thad Godish, Ph.D.
Organization: Ball State Univeristy	**Organization:** Ball State University
Address: Associate Professor of Natural Resources Muncie, IN 47306	**Address:** Associate Professor of Natural Resources Muncie, IN 47306
Phone: 317 / 285-1302	**Phone:** 317 / 285-1302

Abstract: This study is designed to evaluate the nature and extent of formaldehyde contamination of the interiors of conventional homes in the State of Indiana. Delaware County, Indiana, is serving as a model study area for the state. Residences of individuals who complain of home related illness are being sampled and health symptoms experienced by homeowners are being recorded. Data is also being taken on ambient and building interior relative humidity and temperature. Homeowners are being provided with information which may help them to reduce their formaldehyde exposure and/or abate formaldehyde emissions.

References to Completed Work: T.J. Godish, V. Konopinski, and D. Peterson. Formaldehyde Air Pollution in Residential Housing. Submitted for publication in the 1980 Proceedings of the Indiana Academy of Science.

INV. NO. 147

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: University of Illinois, School of Public Health

Project Title: Passive Monitoring of NO_2 in Side-stream Tobacco Smoke

Start Date: April 1, 1980 **End Date:** August 31, 1981

Funding Level: **FY 80** ______ **FY 81** ______ **FY 82** ______

Project Officer:

Name: Internally Supported

Organization: ______

Address: ______

Phone: ___/______

Principal Investigator:

Name: Lucy Elan & R.A. Wadden

Organization: University of Illinois

Address: School of Public Health
P.O. Box 6998
Chicago, IL 60680

Phone: ___/______

Abstract: Determination of the ambient indoor NO_2 concentrations in side-stream tobacco smoke generated by burning cigarettes using dynamic and passive methods of air sampling. Both laboratory-controlled and occupational environments are being studied.

References to Completed Work:

INV. NO. 148

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: University of Illinois, School of Public Health

Project Title: Ozone Production from Photocopying Machines

Start Date: ____ End Date: ____

Funding Level: FY 80 ____ FY 81 ____ FY 82 ____

Project Officer:	Principal Investigator:
Name: Internally Supported	Name: M.D. Selway & R.A. Wadden
Organization:	Organization: University of Illinois
Address:	Address: School of Public Health P.O. Box 6998 Chicago, IL 60680
Phone: /	Phone: /

Abstract: Ten photocopying machines of different makes and models were tested for ozone emissions. All but one produced detectable amounts. Concentrations at operator's breathing zone varied from <4 to 300 μg/m^3, which corresponded to emission rates of <1 to 54 μg/copy. Servicing reduced emissions to <1-4 μg/copy, but preservicing levels were reattained after several weeks of operation.

References to Completed Work: M.D. Selway, R.J. Allen and R.A. Wadden, Ozone Production from Photocopying Machines, Am. Ind. Hyg. Assoc. J., 41(445-459), 1980.

INV. NO. 149

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: University of Illinois, School of Public Health

Project Title: Evaluation of Indoor Particulate Concentrations for an Urban Hospital

Start Date: ____________ End Date: ____________

Funding Level: FY 80 ____ ____ FY 81 ____ FY 82 ____

Project Officer:	Principal Investigator:
Name: Internally Supported	Name: Anneke Neal & R.A. Wadden
Organization:	Organization: University of Illinois
Address:	Address: School of Public Health P.O. Box 6998 Chicago, IL 60680
Phone: ___/______	Phone: ___/______

Abstract: The major finding of this study was that the levels of particulates measured in two intensive care units were low. The arithmetic average indoor TSP concentration was 30.4 $\mu g/m^3$ (41 observations). The mean indoor/outdoor percentage ratio was 44.6% indoor concentrations were significantly less ($p<0.005$) than outdoor levels, and no linear relationship was detected between indoor and outdoor TSP. These observations suggested that the outdoor concentrations did not appear to be a major determinant of indoor TSP levels.

Because of the different nature of the two units, particularly with respect to human activities, it was considered necessary to analyze the data by site as well as season. Such analyses revealed a significant difference in overall mean TSP levels between the two sites as well as a significant difference between seasonal averages for each site. Based on qualitative observations, carpeting, smoking, people movement and window ventilation appeared to influence indoor TSP levels.

References to Completed Work: Anneke DeWerk Neal, Richard A. Wadden and Saul H. Rosenberg, Evaluation of Indoor Particulate Concentrations for an Urban Hospital, Am. Ind. Hyg. Assoc. J., 39(578-582), 1978.

INV. NO. 150

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Temple University School of Medicine

Project Title: Pathogenesis of Mineral Dust Toxicity

Start Date: June 30, 1979

End Date: June 29, 1982

Funding Level: FY 80 $20K FY 81 $20K FY 82

Project Officer:

Name: Samuel S. Herman, Ph.D.
Associate Vice President
for Research

Organization: Temple University
School of Medicine

Address: 3400 N. Broad Street
Philadelphia, PA 19140

Phone: 215 / 221-3250

Principal Investigator:

Name: Dr. Agnes B. Kane
Department of Pathology

Organization: Temple University
School of Medicine

Address: 3400 N. Broad Street
Philadelphia, PA 19140

Phone: 215 / 221-3983

Abstract: The ultimate objective of this research is to describe the pathogenesis of the consequences of inhalation of mineral particles into the lungs. Previous investigations have shown that exposure of primary macrophage cultures to toxic mineral particles such a silica or asbestos results in rapid injury and cell death. These acute cytotoxic reactions of macrophages to toxic mineral particles may initiate a series of events which culminate in pulmonary fibrosis and cancer. This proposed research will study the pathogenesis of silica toxicity to mouse macrophage tumor cells $P388D_1$ in vitro. In this model system, various structural and functional changes will be evaluated as being causally related to the production of silica cytotoxicity. The specific changes to be studied are lysosomal enzyme release, degradation of cellular macromolecules, cell membrane function, and specific intracellular enzyme activities.

References to Completed Work: Schanne, F.A.X, et al., Science 206: 700-702 (1979).

INV. NO. 151

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: State University Construction Fund (SUCF)
State University of New York (SUNY)

Project Title: Asbestos Identification and Control Survey

Start Date: May, 1980

End Date: May, 1980

Funding Level: FY 80 $309,890 FY 81 $214,260 FY 82

Project Officer:

Name: Mr. Morton Gassman
Manager of Facilities and Planning

Organization: State University of New York

Address: State University Plaza
P.O. Box 1946
Albany, NY 12201

Phone: 518 / 473-7544

Principal Investigator:

Name: Mr. Samuel Syrotynski, P.E.

Organization: New York State Department of Health (DOH)

Address: Empire State Plaza
Tower Bldg. - Room 372
Albany, NY 12237

Phone: 518 / 474-4987

Abstract: DOH is conducting an asbestos identification and control program for buildings owned and operated under the State University system. Approximately 1200 buildings located at 29 separate campuses will be surveyed and separately reported upon. The purpose of the program is to: (1) establish the extent to which asbestos containing materials have been used within each building, (2) determine the physical condition of asbestos containing materials and assess exposure risks, (3) develop a permanent record and inventory for asbestos containing materials for each building, (4) provide guidelines to assist in the determination of future measures. Building surveys include observations made by inspection, collection for analysis of bulk samples of suspected asbestos materials, air sample collection for fiber (and asbestos analysis) and the evaluation of building air management systems. Reports are not available at this time.

References to Completed Work:

INV. NO. 152

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: TSI Incorporated

Project Title: Development of an automated respirable aerosol mass monitor

Start Date: October 1978 **End Date:** June 1981

Funding Level: FY 80 ______ FY 81 ______ FY 82 ______

Project Officer:	**Principal Investigator:**
Name: Gilmore Sem	**Name:** Fred Quant
Organization: TSI Incorporated	**Organization:** TSI Incorporated
Address: Box 43394 St. Paul, MN 55164	**Address:** Box 43394 St. Paul, MN 55164
Phone: 612 / 483-0900	**Phone:** 612 / 483-0900

Abstract: Previous methods of measuring respirable aerosol mass concentration in relatively clean indoor and outdoor ambient atmospheres were either 1) indirect methods, such as light scattering, which required calibration for each aerosol by a reference mass-sensitive method, 2) manually-operated instruments, such as the portable piezoelectric microbalance, which could not be used for unattended continuous monitoring, or 3) filter samplers with gravimetric mass measurement which were not capable of near-real-time monitoring.

This development program will result in a new commercial respirable aerosol concentration monitor with particle mass sensitivity, automatic unattended operation, and near-real-time sensitivity. The instrument will utilize a piezoelectric microbalance sensor, an automatic sensor cleaner, and a microprocessor-controlled data handling system. The operator will be able to select sampling cycles, concentration averaging times, and data printout format for unattended continuous area monitoring. Routine maintenance requirements will be limited to a few minutes once every week for half-hour sampling cycles.

References to Completed Work:

INV. NO. 153

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Honeywell, Inc.

Project Title: Gas Detectors

Start Date: 1979 End Date: Ongoing

Funding Level: FY 80 $70K FY 81 FY 82

Project Officer:	Principal Investigator:
Name: J. Williams	Name: J. Garfunkel
Organization: Honeywell, Inc., TSC	Organization:
Address: 1700 West Highway 36 St. Paul, MN 55113	Address:
Phone: /	Phone: /

Abstract: Effort is underway to build and show feasibility of using IR-LED's in NDIR devices to detect and measure dilute concentrations of CO, CO_2, CH_4, SO_2, NO_x and possibly other gasses. Application interest is for combustion control and indoor air pollution control.

References to Completed Work:

INV. NO. 154

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Honeywell, Inc.

Project Title: Electronic Air Cleaning and Smoke Detection

Start Date: About 1955 **End Date:** None

Funding Level: FY 80 ____ FY 81 ____ FY 82 ____

Project Officer:	**Principal Investigator:**
Name:	**Name:**
Organization:	**Organization:** Honeywell, Inc.
Address:	**Address:** Residential Division Honeywell Plaza Minneapolis, MN 55408
Phone: /	**Phone:** 612 / 870-5200

Abstract: Honeywell has marketed residential and commercial electronic air cleaners for over 20 years. Many technical papers have been published by various authors. Honeywell also produces an electronic smoke detector that is widely marketed. Research on this device goes back more than 20 years.

References to Completed Work:

INV. NO. 155

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Honeywell, Inc., Corporate Technology Center

Project Title: Combustion Modeling

Start Date: About 1970 End Date: ?

Funding Level: FY 80 FY 81 FY 82

Principal Investigator:	Principal Investigator:
Name: Dr. U. Bonne	Name: J. E. Janssen
Organization: Honeywell, Inc., CTC	Organization: Honeywell, Inc., TSC
Address: 10701 Lyndale Ave. So. Minneapolis, MN 55420	Address: 1700 W. Highway 36 St. Paul, MN 55113
Phone: 612 / 887-4477	Phone: 612 / 378-4937

Abstract: This covers a number of projects in the area of Combustion Modeling. While it is used mostly for furnaces and enclosed combustion processes, it applies to open flames such as gas cooking ranges. The effect of combustion air consumption on air infiltration (and ventilation) in residences has been modeled and measured. About half the air consumed by a furnace contributes to increased infiltration and ventilation. Use of outdoor air for combustion eliminates this ventilating effect.

References to Completed Work: Bonne, U., Janssen, J.E., Torborg, R.H., Pearman, A.N.J., and Johnson, A.E., "Digital Simulation of the Seasonal Efficiency of Combustion Heating Systems", ASHRAE Seminar Paper, June 1975.

Bonne, U., Janssen, J.E., Nelson, L.W., and Torborg, R.H., "Control of Overall Thermal Efficiency of Combustion Heating Systems", Proc. of 16th Int. Symp. on Comb., Cambridge, MA, August 1976, pp. 37-52.

INV. NO. 156

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Honeywell, Inc.

Project Title: Residential Infiltration

Start Date: 1973

End Date: ?

Funding Level: FY 80 ______ **FY 81** ______ **FY 82** ______

Project Officer:

Name: ______

Organization: ______

Address: ______

Phone: ___/______

Principal Investigator:

Name: J. E. Janssen

Organization: Honeywell, Inc., TSC

Address: 1700 West Highway 36
St. Paul, MN 55113

Phone: 612 / 378-4937

Abstract: Tracer Gas Measurements have been made in about 20 different houses in Minnesota, California, Colorado and Missouri. The effect of energy conservation efforts has shown that infiltration of 0.1 to 0.2 air changes per hour can be achieved. This level of infiltration may be too low to control indoor pollution in many cases. The point at which positive ventilation with heat recovery for energy conservation is required has not yet been defined.

References to Completed Work: Janssen, J.E., Glatzel, J.J., Torborg, R.H., and Bonne, "Infiltration in Residential Structures", Heat Transfer in Energy Conservation, ASME, Nov. 1977, pp. 33-38.

INV. NO. 157

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: E. I. du Pont de Nemours and Company

Project Title: Development of Passive Dosimeters for Monitoring Formaldehyde and Carbon Monoxide at ppb Concentration Level

Start Date:	Current	**End Date:**	
Funding Level: FY 80		FY 81	FY 82

Project Officer:	**Principal Investigator:**
Name:	**Name:** William J. Lautenberger
Organization:	**Organization:** E. I. du Pont de Nemours and Company
Address:	**Address:** Applied Technology Devision P.O. Box 10, N. Walnut Road Kennett Square, PA 19348
Phone: /	**Phone:** 215 / 444-1060

Abstract: Continued development of Pro-Tek™ badge systems will include systems for measuring carbon monoxide at levels between 1-500 ppb and formaldehyde between 50-1000 ppb. Laboratory validation and field testing is planned.

References to Completed Work:

INV. NO. 158

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: E. I. du Pont de Nemours and Company

Project Title: Development of Passive Dosimeters for Monitoring SO_2, NO_2 and NH_3 at ppb Concentration Levels

Start Date: Current

End Date:

Funding Level: **FY 80** **FY 81** **FY 82**

Project Officer:

Name:

Organization:

Address:

Phone: /

Principal Investigator:

Name: William J. Lautenberger

Organization: E.I. du Pont de Nemours and Company

Address: Applied Technology Division
P.O. Box 10, N. Walnut Road
Kennett Square, PA 19348

Phone: 215 / 444-1060

Abstract: Air monitoring badge systems for measuring occupational levels of SO_2, NO_2, and NH_3 have been developed and commercialized under the Pro-Tek™ trademark. Redesign of the badge to measure ppb concentration levels, subsequent laboratory validation, and field testing are proposed.

References to Completed Work:

INV. NO. 159

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Terradex Corporation

Project Title: Develop Track Etch® in Support of Radon Monitoring

Start Date: 1978 **End Date:**

Funding Level: **FY 80** $70K **FY 81** $70K-150K **FY 82**

Project Officer:	**Principal Investigator:**
Name: H. Ward Alter, President	**Name:**
Organization: Terradex Corporation	**Organization:** General Electric Co., Terradex
Address: 460 N. Wiget Lane Walnut Creek, CA 94598	**Address:** Schenectady and Walnut Creek
Phone: 415 / 938-2545	**Phone:** /

Abstract: Develop configurations for use of Track Etch detectors. Calibrate system in variety of radon chambers. Field test both indoor and outdoor. Determine sensitivity and background. Improve reading for lower cost. Develop integrating radon proofing passive dosimeter.

References to Completed Work: Health Physics (1981), Bombay, Jan. 19-23, 1981, Fort Collins, Nov. 1980.

INV. NO. 160

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Eberline Division of Thermo Electron Corp.

Project Title: Portable Working Level Monitor

Start Date: October, 1980	**End Date:** June, 1981
Funding Level: **FY 80** Internally Funded	**FY 81** - **FY 82** -
Project Officer:	**Principal Investigator:**
Name:	**Name:** 1) R. Beard 2) F. Fraim
Organization:	**Organization:** R&D Division of Thermo Electron
Address:	**Address:** 1) Santa Fe, NM 2) Waltham, MA
Phone: /	**Phone:** 1) 505/471-3232 2) 617/890-8700

Abstract: Project is to develop portable radon daughter working level monitor for indoor measurements. Instrument will collect and store hourly averages for periods of up to 200 hours. At end of the period data can be read out with readout device. Internal batteries provide continuous operation for up to 200 hours.

References to Completed Work:

INV. NO. 161

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Montana Department of Health & Environmental Sciences

Project Title: Butte Radiation Study

Start Date:	March, 1978	**End Date:**	
Funding Level: FY 80	$83K	FY 81 $240K	FY 82

Project Officer:	**Principal Investigator:**
Name: Larry Lloyd	**Name:** Larry Lloyd
Organization: Dept. of Health & Env. Sciences	**Organization:** Dept. of Health & Env. Sciences
Address: Helena, MT 59601	**Address:** Helena, MT 59601
Phone: 406 / 449-3671	**Phone:** 406 / 449-3671

Abstract: Research of elevated concentrations of radon and radon progeny in Butte structures. Studies are underway to determine levels of exposure, geographical areas involved and associated health risks. Efforts are underway to determine radon source terms and possible methods of remediation.

References to Completed Work:

INV. NO. 162

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Atomic Energy Control Board, Ottawa, Canada on behalf of the Federal Provincial Task Force on Radioactivity

Project Title: Investigation Management and Implementation of Remedial Measures for Radioactive Decontamination of Bancroft, Ontario (Radon and Radon Daughters in Buildings)

Start Date: 1978

End Date: 1981

Funding Level: FY 80 CAN$900K FY 81 CAN$312K FY 82

Project Officer:	**Principal Investigator:**
Name: Roger S. Eaton	**Name:** P. J. Manley
Organization: Manager, Radioactivity Remedial Action Group	**Organization:** MacLaren Engineers Planners & Scientists, Inc.
Address: Atomic Energy Control P.O. Box 1046 Ottawa, Ont. Canada KIP 5S9	**Address:** P.O. Box 1359 Bancroft, Ontario KOL 1CO
Phone: 613 / 593-5123	**Phone:** 613 / 332-1721

Abstract: While some active waste rock is present, the main problem is natural radon in soil gas. The main remedial method has been basement sealing. Subfloor ventiliation is also used in difficult situations.

References: AECB Bibliography

INV. NO. 163

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Atomic Energy Control Board, Ottawa, Canada on behalf of the Federal Provincial Task Force on Radioactivity

Project Title: Investigation Management and Implementation of Remedial Measures for Radioactive Decontamination of Uranium City, Saskatchewan (Radon and Radon Daughters in Buildings)

Start Date: 1977 **End Date:** 1981

Funding Level: FY 80 CAN$700K FY 81 CAN$450K FY 82

Project Officer:	**Principal Investigator:**
Name: Roger S. Eaton, Manager	**Name:** W. O. Findlay
Organization: Radioactivity Remedial Action Group Atomic Energy Control Board	**Organization:** DSMA/ACRES/CAMBRIAN
Address: P.O. Box 1046 Ottawa, Ont. Canada KIP 5S9	**Address:** P.O. Box 550 Uranium City, Sask. SOJ 2WO
Phone: 613 / 593-5123	**Phone:** 306 / 498-3500

Abstract: While some active waste rock is present, the main problem is natural radon in soil gas. The main remedial method has been basement sealing. Sub-floor ventilation is also in difficult situations.

References: AECB Bibliography

INV. NO. 164

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Atomic Energy Control Board, Ottawa, Canada on behalf of the Federal Provincial Task Force on Radioactivity

Project Title: Investigation Management and Implementation of Remedial Measures for Radioactive Decontamination of Elliot Lake, Ontario (Radon and Radon Daughters in buildings)

Start Date: 1977 End Date: 1981

Funding Level: FY 80 CAN$1,200K FY 81 CAN$750K FY 82

Project Officer:	Principal Investigator:
Name: Roger S. Eaton, Manager	Name: B. C. Stonehill
Organization: Radioactivity Remedial Action Group Atomic Energy Control Board	Organization: DSMA/Acres
Address: P.O. Box 1046 Ottawa, Ont. Canada K1P 5S9	Address: 4195 Dundas Street West Toronto, Ont. M8X 1Y4
Phone: 613 / 593-5123	Phone: 416 / 239-3011

Abstract: While some active waste rock is present, the main problem is natural radon in soil gas. The main remedial method has been basement sealing. Subfloor ventilation is also used in difficult situations.

References: AECB Bibliography

INV. NO. 165

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Atomic Energy Control Board, Ottawa, Canada, on behalf of the Federal Provincial Task Force on Radioactivity

Project Title: Investigation Management and Implementation of Remedial Measures for Radioactive Decontamination of Port Hope, Ontario (Radon and Radon Daughters in Buildings.

Start Date: 1976

End Date: 1981

Funding Level: FY 80 $1,200K FY 81 $100K Canadian FY 82

Project Officer:

Name: Roger S. Eaton, Manager

Organization: Radioactivity Remedial Action Group Atomic Energy Control Board

Address: P.O. Box 1046
Ottawa, Canada
K1P 5S9

Phone: 613 / 593-5123

Principal Investigator:

Name: E. J. Chart

Organization: MacLaren Engineers Planners & Scientists Inc.

Address: 1220 Sheppard Avenue East
Suite 100
Willowdale, Ontario
M2K 2T8

Phone: 416 / 499-0880

Abstract: Port Hope has been contaminated from refinery residues and building rubble. Material is being removed where possible - basements are being sealed or subfloor ventilation employed where necessary.

References: **AECB Bibliography**

INV. NO. 166

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Health & Welfare - Canada

Project Title: The Effect on Environmental Factors on the Respiratory Health of School Children in Hamilton-Indoor Air Quality Section

Start Date: October 18, 1980 End Date: August 31, 1982

Funding Level: FY 80 $98,935 FY 81 $146,521 FY 82

Project Officer:	Principal Investigator:
Name: Dr. G. C. Becking, Chief	Name: L. D. Pengelley (S.A. Toplack, Manager)
Organization: Environmental & Occupational Toxicology Div. Health Protection Branch, Environmental Health Ctr. Dept. of Nat'l Health & Welfare	Organization: McMaster University
Address: Tunney's Pasture Ottawa, Ontario K1A 0L2	Address: Dept. of Medicine, Urban Air Environment Group HSC, Room 3E27 1200 Main Street W. Hamilton, Ontario L8N 3Z5
Phone: 613 / 992-5250	Phone: / 525-9140 Ext. 2720

Abstract: To provide input on indoor air quality into our major health effects study, we propose to sample for particulates, SO2 and NO2 on a 24-hour basis, using samplers designed and built in-house. Our present funding levels will enable us to examine air quality in sixteen schools and twenty-four residences once each season for one year. We will also be running essentially the same monitor outdoors, at that same address, and will be comparing our data with data collected by means of standard instruments. Greater detail on our proposed work plan is available upon request.

References to Completed Work:

INV. NO. 167

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Legal Services Society of B.C.

Project Title: Office Environment Analysis

Start Date: March, 1980
End Date: June, 1980

Funding Level: **FY 80** $6,000 **FY 81** **FY 82**

Project Officer:

Name: Ms. Barbara Bell
Organization: Legal Services Society of B.C.
Address: P.O. Box 12129
555 West Hastings
Vancouver, B.C. V6B 4N6 CAN
Phone: /

Principal Investigator:

Name: Mr. Elia Sterling
Organization: Cornerstone Planning Group Limited
Address: 22-1557 Johnstone
Granville Island
Vancouver, B.C.
Phone: 604 / 687-5896

Abstract: This project involved surveying the existing physical conditions of the office space, reviewing absentee records, and administering physical and mental performance tests to Legal Services staff and a control group. The objective was to determine if health impairments and the complaints of discomfort described in a staff survey could be linked to existing environmental conditions. Further methods of verifying the assumptions of hazardous conditions were described. Methods of altering the environment to reduce the health hazards were suggested.

References to Completed Work: In-house document, Cornerstone Planning Group Limited

INV. NO. 168

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Legal Services Society of B.C.

Project Title: Office Environment Analysis Follow-up Study

Start Date: March, 1980

End Date: June, 1980

Funding Level: FY 80 $6,000 FY 81 FY 82

Project Officer:

Name: Ms. Barbara Bell

Organization: Legal Services Society of B.C.

Address: P.O. Box 12129
555 West Hastings
Vancouver, B.C. V6B 4N6/CAN

Phone: /

Principal Investigator:

Name: Mr. Elia Sterling

Organization: Cornerstone Planning Group Limited

Address: 22-1557 Johnston
Granville Island
Vancouver, B.C.

Phone: 604 / 687-5896

Abstract: This project involves supervising and coordinating the implementation of modifications to the lighting and air supply system in the Harbour Centre offices of the Legal Services Society of B.C. The modifications are based on recommendations suggested in a previous study conducted by Cornerstone Planning Group Limited. Continuous monitoring of the impact of modification on staff health and comfort will also be undertaken during the implementation period.

References to Completed Work:

INV. NO. 169

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Simon Fraser University

Project Title: Levels of Pollutants Reported Indoors

Start Date: 1970 End Date:

Funding Level: FY 80 FY 81 FY 82

Project Officer:	Principal Investigator:
Name:	Name: Theodor D. Sterling
Organization:	Organization:
Address:	Address: University Research Professor Simon Fraser University Burnaby, British Columbia V5A 1S6
Phone: /	Phone: 604 / 291-4685 and 733-1348

Abstract: Ongoing review of levels of different pollutants reported in the literature.

References to Completed Work: T. D. Sterling, Exposure to Pollutants in Enclosed "Living" Spaces, Environmental Research, February, Vol. 13: 1-13.

INV. NO. 170

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: Agricultural University Wageningen, The Netherlands

Project Title: Air Quality in Homes

Start Date: October 1980

End Date: October, 1984

Funding Level: FY 80 ______ FY 81 $350K FY 82 ______

Project Officer:

Name: ______

Organization: ______

Address: ______

Phone: ___/______

Principal Investigator:

Name: Erik Lebret, Bert Brunekreef, Jan S.M. Boleij, Klaas Biersteker Eep Adema

Organization: Departments of Environmental Health/Air Pollution Agricultural Unv.

Address: P.O. Box 8128
6700 ET WAGENINGEN
The Netherland

Phone: ___/ 08370-82080

Abstract: In random samples of houses in the Netherlands air quality is characterized. Measurements include carbon monoxide, oxides of nitrogen and particulate matter. In addition, average ventilation rates, temperature and relative humity will be assessed.

References to Completed Work:

INV. NO. 171

INDOOR AIR RESEARCH INVENTORY

Sponsoring Organization: United Nations Environment Programme

Project Title: Health Related Air Monitoring Project

Start Date: October 1979
End Date: October 1982

Funding Lev 1: FY 80 FY 81 FY 82

Project Officer:

Name: Dr. H.W. de Koning
Organization: Div. of Environmental Health World Health Organization
Address: 1211 Geneva 27
Switzerland
Phone: / 91.35.67

Principal Investigator:

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Abstract: The health related air monitoring project involves the implementation of five pilot studies in different parts of the world having different climates, different life styles, different pollution profiles, to test techniques to assess human exposure to air pollutants. Each of the studies will include an indoor/outdoor monitoring, a personal monitoring and an ambient monitoring component. The results of the studies are expected to indicate which are critical components in a monitoring programme in order to assess human exposure. Two pilot studies, one in Toronto/Hamilton, Canada, and one in Zagreb, Yugoslavia, have been started and two others, one in Sao Paulo, Brazil, and one in China are being planned.

References to Completed Work: